

## CHAPTER 3 AFFECTED ENVIRONMENT

This chapter provides detailed information on current test and training operations at the Naval Air Warfare Center Weapons Division (NAWCWPNS) Point Mugu Sea Range as well as describes existing conditions of environmental resources that may be affected by the proposed action or alternatives. This chapter is divided into two major subsections: Section 3.0 (page 3.0-1) provides an overview of the Point Mugu Sea Range and describes Point Mugu Sea Range baseline operations, and Sections 3.1 through 3.14 (starting on [page 3.1-1](#)) describe the affected environment in terms of 14 resource areas: geology and soils; air quality; noise; water quality; marine biology; fish and sea turtles; marine mammals; terrestrial biology; cultural resources; land use; traffic; socioeconomics (including Environmental Justice); hazardous materials, hazardous wastes, and non-hazardous wastes; and public safety. The information in these resource sections provides baseline data from which to identify and evaluate potential impacts that could result from implementation of the proposed action or alternatives. The data presented are commensurate with the importance of potential impacts in order to provide the proper context for the analysis.

A region of influence (ROI) has been identified and analyzed for each resource. An ROI is a geographic area in which environmental effects for that resource would be most likely to occur. For most resources, the ROI includes the Point Mugu Sea Range and range support facilities at Naval Air Station (NAS) Point Mugu and San Nicolas Island (described in the following section). Because Sea Range activities on San Miguel, Santa Rosa, and Santa Cruz islands are minimal, these islands are included in the ROI only for selected resources as appropriate. Although they are located within the ROI, there are no current or proposed Sea Range activities on Anacapa or Santa Barbara islands.

A glossary of operational terms (including a table of English to metric unit conversion factors) is presented in [Chapter 10](#), Glossary and Index.

### 3.0 CURRENT ACTIVITIES

#### 3.0.1 NAWCWPNS Point Mugu Overview

##### 3.0.1.1 Description



NAS Point Mugu

NAS Point Mugu operates and maintains station facilities and provides support services for NAWCWPNS and other tenants. These services include the Point Mugu air terminal, air traffic control, firefighting and crash crews, and airfield services. NAS Point Mugu does not provide port or docking facilities for any ships or boats.

NAWCWPNS Point Mugu controls 36,000 square miles (93,200 km<sup>2</sup>) of Special Use Airspace (SUA) over the Pacific Ocean associated with the Sea Range (refer to [Figure 1-2](#)). SUA is airspace within which

specific activities must be confined, or wherein limitations are imposed on aircraft not participating in



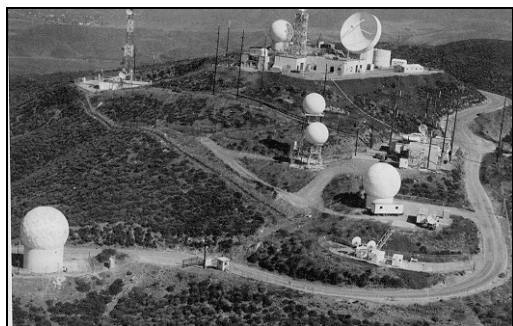
those activities. This area provides the Navy with a realistic operational environment for the safe conduct of controlled air, surface, and subsurface launched missile tests, aircraft tests, and fleet exercises involving aircraft, surface ships, and various targets. The combination of location, widespread instrumentation sites, unique test capabilities, and a highly skilled technical workforce provides the most advanced and efficient method for conducting the critical test and evaluation (T&E) and training necessary to maintain technical standards in the U.S. Navy.

Sufficient usable airspace for T&E, training, and other range activities is vital to the success of meeting NAWCWPNS Point Mugu mission requirements. Airspace overlying the Sea Range includes both Restricted Areas and Warning Areas. Restricted Areas are airspace over U.S. land or Territorial Waters that are used by the military to exclude non-authorized aircraft and to contain hazardous military activities. The term “hazardous” implies, but is not limited to, firing of weapons, aircraft training and testing, and other specialized events from which it is prudent to exclude civil air traffic. Warning Areas are designated airspace for military activities that are in international airspace but are open to all aircraft. Flights in Warning Areas by non-participating aircraft are not prohibited since these areas are over international waters.

The airspace of the Restricted and Warning Areas extend from the surface to an “unlimited” altitude. However, Sea Range operations are typically conducted well below 100,000 feet (30,500 m). The restricted areas on the Sea Range are over San Nicolas Island, over the NAS Point Mugu airfield, and over nearshore waters adjacent to the airfield. NAWCWPNS Point Mugu takes every reasonable measure to ensure that Sea Range airspace is clear of non-participating air and sea traffic prior to any hazardous activities.

### 3.0.1.2 Regional Location

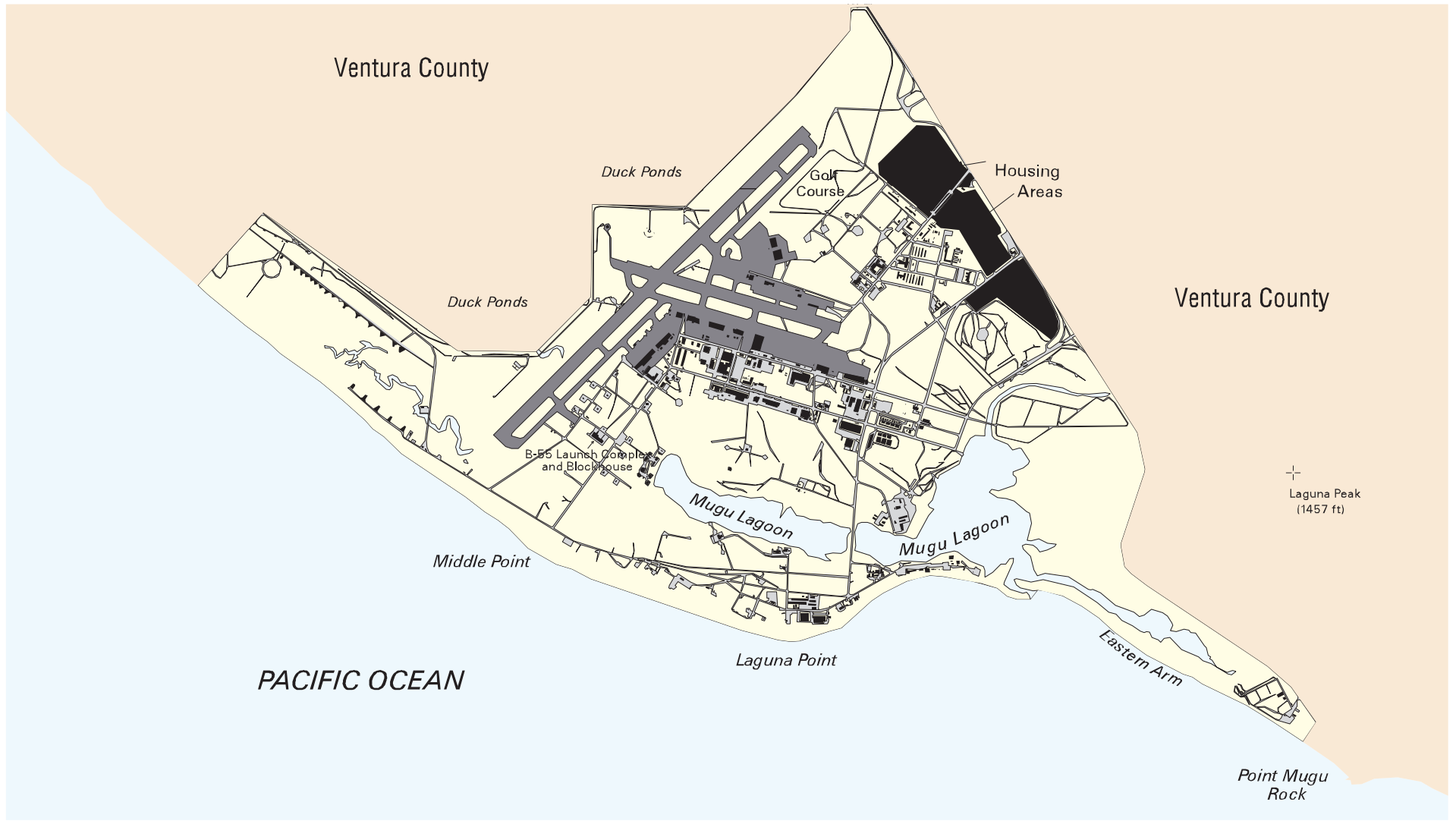
The deep ocean area and controlled airspace associated with the Point Mugu Sea Range parallels the California coastline for about 200 miles (320 km) and extends seaward for more than 180 miles (290 km). The NAS main base at Point Mugu consists of 4,490 acres (1,817 hectares [ha]) on the Pacific coast, approximately 50 miles (80 km) northwest of Los Angeles, in southern Ventura County (Figure 3.0-1). The base is bounded by U.S. Highway 1 on the northeast, the Pacific Ocean along the south and west, and an agricultural buffer zone established by the County of Ventura to the north and northwest.



*Instrumentation Facilities on Laguna Peak*

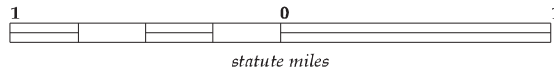
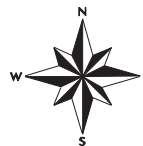
In addition to the main base area, instrumentation facilities are located on Laguna Peak, a 1,457-foot (444-m) above mean sea level (MSL) summit at the western end of the Santa Monica Mountains. This peak is just east of the base, providing an elevated line of sight for surface surveillance radar, telemetry reception, and optical tracking, as well as an over-the-horizon transmitter capability for the flight control of pilotless aircraft. The Navy owns and uses 44 acres (18 ha) at the summit of Laguna Peak to house instrumentation and communication facilities.

# NAS Point Mugu



## Legend

- NAS Point Mugu
- Structures
- Surface Water
- Roads
- Airfield



Projection: Universal Transverse Mercator, Zone 11  
 North American Datum of 1927  
 Scale shown is 1:45,000  
 Source: NAWCWPNS.

### 3.0.1.3 NAS Support Operations

#### A - Support Activities

NAS Point Mugu operates the base and the support services for NAWCWPNS at Point Mugu and on San Nicolas Island. These activities are in direct support of NAWCWPNS and other base tenants for the T&E and training at NAS Point Mugu, San Nicolas Island, and the Point Mugu Sea Range. A civilian and military workforce provides the essential base public works support including facilities engineering and maintenance, utilities, and transportation services to San Nicolas Island. NAS Point Mugu employees also provide supply, administrative, military community service programs, and physical security services for the base. The Point Mugu Environmental Division is a part of the Public Works Department. This office manages the environmental programs for cleanup, conservation, pollution prevention, and compliance with federal, state, and local environmental laws and regulations.

#### B - Airfield Operations

NAS Point Mugu has two main runways: the primary runway (designation 03/21) is 11,000 feet (3,350 m) long, and the secondary runway (designation 09/27) is 5,500 feet (1,680 m) long. Both runways have loading capacities of 700,000 pounds (320,000 kg) and can accommodate aircraft as large as C-5s. There are ten hangars for aircraft maintenance and support. The airfield area also contains munitions storage bunkers and revetment areas for the storage, handling, and loading of missiles, targets, and other munitions. The runway and air traffic control facilities are operated and maintained by NAS Point Mugu. [Table 3.0-1](#) presents a breakdown of airfield operations by the major type of aircraft (military and civilian) at NAS Point Mugu for FY95. Civilian traffic is for local civilian airports or civilian traffic operating in the greater Oxnard Plain area.

**Table 3.0-1. Point Mugu Airfield Total Aircraft Operations, FY95<sup>1</sup>**

	FY95
Military	19,866
Civilian	5,300
<b>Total</b>	<b>25,166</b>

<sup>1</sup> During the preparation of this EIS/OEIS, the Navy announced its decision to realign four E-2 squadrons from Marine Corps Air Station Miramar to NAS Point Mugu (the Record of Decision was signed in June of 1998). The realignment included 16 aircraft and associated support personnel and their families (Southwest Division 1998). The addition of the E-2 aircraft to Point Mugu results in an increase of 20,767 aircraft operations per year at the airfield.

Source: NAWCWPNS Point Mugu 1998j.

The airspace in the Point Mugu local area is heavily traveled. Navy Air Traffic Control provides services to military and civilian aircraft operating near NAS Point Mugu. The majority of airspace associated with the Point Mugu Sea Range is over international waters. Control of this airspace is governed by international agreements that apply to transoceanic flight by aircraft. The control of civil aircraft operating under Instrument Flight Rule (IFR) clearances and transiting the Sea Range is accomplished by the Federal Aviation Administration (FAA) Los Angeles Air Route Traffic Control Center. Aircraft operating under Visual Flight Rule (VFR) conditions are not precluded from operating in the Warning Area airspace over the Sea Range; however, during hazardous activities, every effort is made by both the FAA and NAWCWPNS Point Mugu to ensure that non-participating aircraft are clear of potentially hazardous areas on the Sea Range.

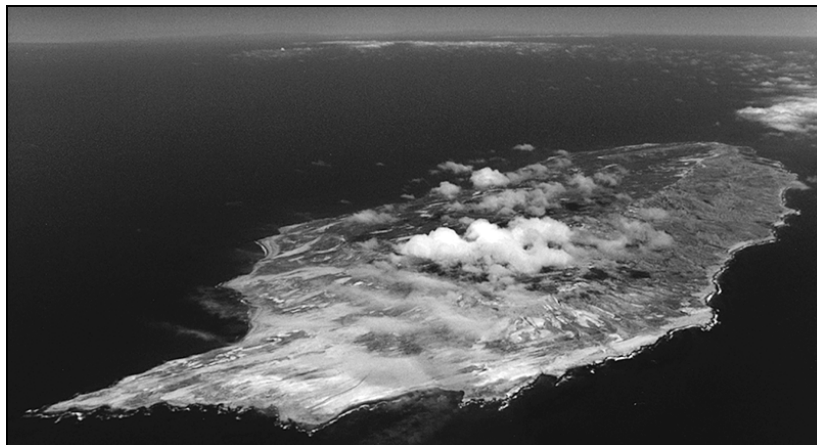
### C - Aircraft Maintenance Facilities

NAS Point Mugu operates aircraft maintenance facilities, including hangars, aircraft spares storage buildings, and engine maintenance shops. Most of the aircraft maintenance facilities are located in the vicinity of the runways. However, the Aircraft Maintenance Department operates two aircraft maintenance complexes near the beach. The first complex includes engine maintenance shops and an aircraft spares storage facility, while the second complex is comprised of an engine maintenance shop and jet engine test cells. The test cells, used to test jet engines used on the Sea Range, are located at the south end of Laguna Road near the beach. This complex includes both inside and outside test cells. The inside cells are permitted (under a stationary source air quality permit) to operate for 200 hours per year while the outside test cells are permitted to operate for 250 hours per year. Typically, the test cells will be operated for a few hours per day for about one week, at a frequency of approximately once per month.

### D - Range Facilities at the Channel Islands

In addition to the facilities at NAS Point Mugu and Laguna Peak, the Point Mugu Sea Range encompasses San Nicolas Island and portions of the northern Channel Islands (refer to [Figure 1-2](#)). Four of the Channel Islands are either owned by the Navy or provide Navy instrumentation sites that are critical to Sea Range operations. These islands are San Nicolas Island and San Miguel Island, which are owned by the Navy; Santa Cruz Island, the majority of which is owned by the Nature Conservancy (the National Park Service [NPS] owns 14,733 acres of the eastern portion) with approximately 10 acres leased by the Navy; and Santa Rosa Island, which is owned by the NPS. Although owned by the Navy, San Miguel Island is jointly managed by the Navy and the NPS which administers the management program. San Miguel, Santa Cruz, Santa Rosa, Santa Barbara, and Anacapa islands form the Channel Islands National Park (CINP).

#### *San Nicolas Island*



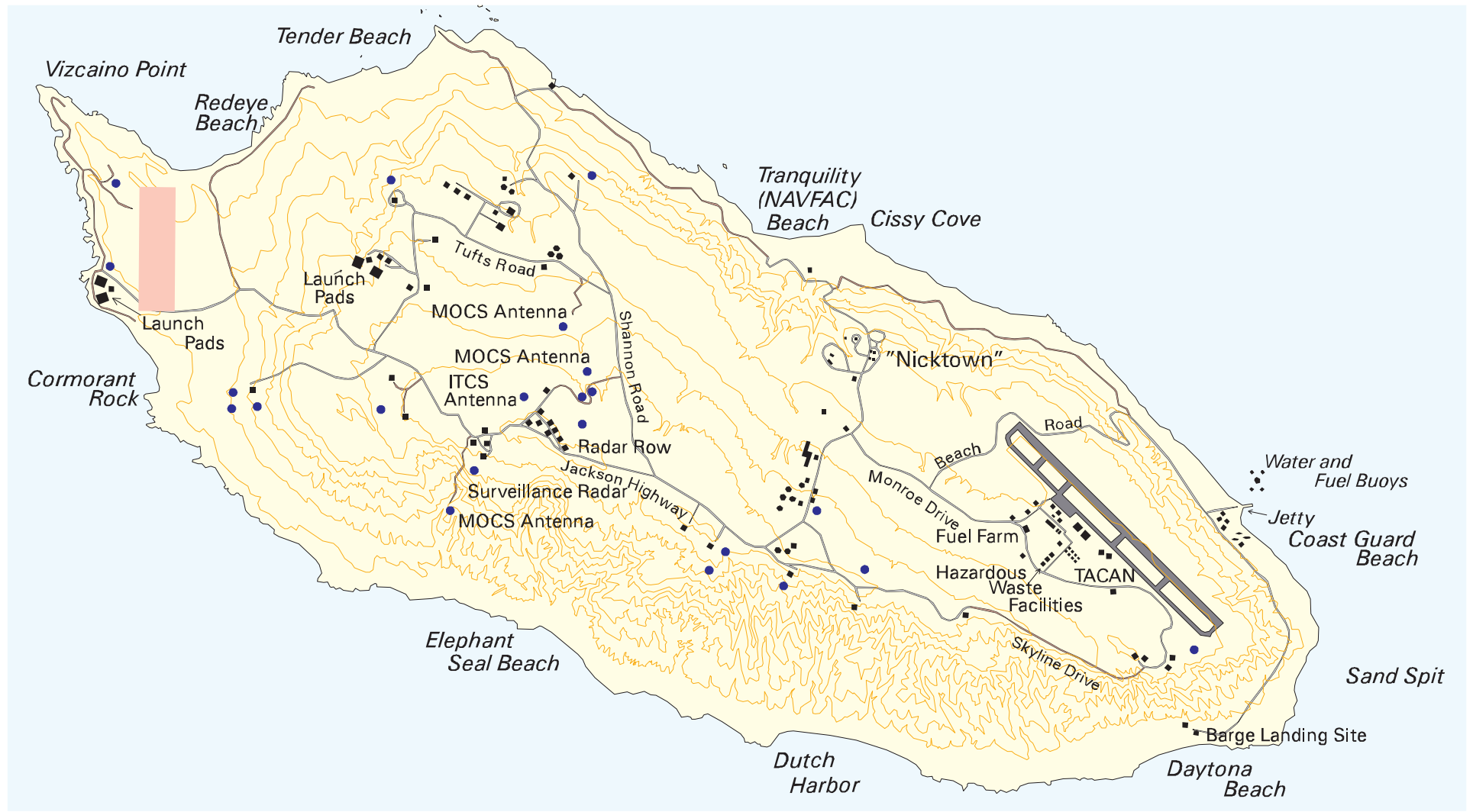
*San Nicolas Island*

Located approximately 65 miles (105 km) southwest of Point Mugu, San Nicolas Island is owned and operated by the Navy as a major element of the Point Mugu Sea Range. Because of its strategic location offshore, San Nicolas Island is important to the Sea Range because it can be used to simulate shipboard launches of missiles and targets. The island is 9 miles (14 km)






long by 3.6 miles (5.8 km) wide, encompasses 13,370 acres (5,411 ha) ([Figure 3.0-2](#)), and is on the line that separates the inner and outer Sea Range. An airfield (designation 12/30) is located on San Nicolas Island near the southeastern edge of the island's central mesa. The landing area consists of one 10,000-foot (3,050-m) concrete and asphalt runway. The airfield can accommodate aircraft up to the size and weight of C-5 aircraft. The island is extensively instrumented with metric tracking radar, electro-optical devices, telemetry, and communications equipment necessary to support long-range and over-the-horizon weapons testing and fleet training. It houses facilities that support all aspects of range operations, such as missile and target launches and missile impacts and scoring.

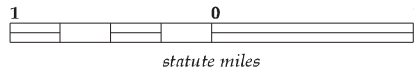
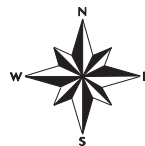


# San Nicolas Island



## Legend

-  Airfield
-  Structures
-  SLAM Area of Potential Effect
-  Instrumentation
-  100' Contour Lines

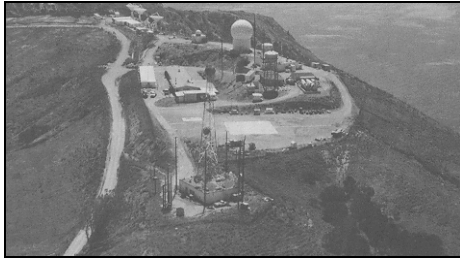


Projection: Universal Transverse Mercator, Zone 11  
 North American Datum of 1927  
 Scale shown is 1:60,000  
 Source: NAWCWPNS.

**Figure**

**3.0-2**

### *Santa Cruz Island*



*Instrumentation Facilities at  
Santa Cruz Island*

Located approximately 25 miles (40 km) west of Point Mugu, Santa Cruz is the largest of the eight Channel Islands, measuring 24 miles (39 km) long and varying in width from 2 to 7 miles (3 to 11 km). NAWCWPNS Point Mugu leases approximately 10 acres (4.1 ha) from the Nature Conservancy on the southeast part of the island as an instrumentation site for the Sea Range.

### *San Miguel Island*

Located approximately 70 miles (110 km) west of Point Mugu, San Miguel Island is owned by the Navy but is jointly managed by the Navy and the NPS, who administers the program as part of the CINP. There are no Navy facilities on the island except for an unmanned, remotely interrogated solar powered automatic weather station.

### *Santa Rosa Island*

Located approximately 49 miles (77 km) west of Point Mugu, Santa Rosa Island is owned by the NPS. There are no Navy facilities on the island except for a tracking antenna.

## **3.0.2 Baseline Point Mugu Sea Range Operations**

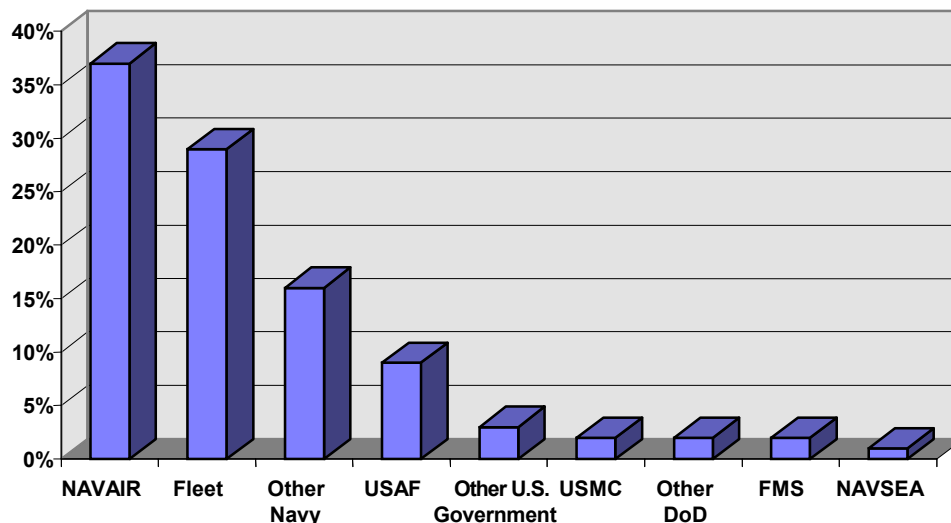
This section describes baseline operations at the Point Mugu Sea Range. Baseline operations include aircraft types and typical routes used, the range planning process, range safety procedures, and detailed descriptions of the five major types of test operations performed at the range, as well as the large fleet training exercises (FLEETEXs) conducted at the range twice each year. This section concludes with quantitative data on range use and tempo (including locations) for FY95. This quantification of operations tempo establishes a NAWCWPNS Point Mugu baseline (refer to [Section 2.1.4](#)) to which proposed operational changes can be compared.

### 3.0.2.1 Operations Background

#### A - Operations Overview

NAWCWPNS activities at Point Mugu provide T&E of weapon systems by providing U.S. and allied forces modeling and simulation capabilities and an area to perform actual operations and missile firings. The Point Mugu Sea Range provides operationally realistic climatological and physical features which closely simulate conditions in many of the primary threat regions of the world. Although range activities have historically had a Navy focus, all services within the DoD use the range facilities. NAWCWPNS Point Mugu's customers include Naval Air Systems Command (NAVAIR); Naval Sea Systems Command (NAVSEA); U.S. Pacific Fleet; the U.S. Marine Corps (USMC); the U.S. Air Force (USAF); other Department of Defense (DoD) agencies; and foreign military sales (FMS). The composition of Point Mugu Sea Range customers is shown in [Figure 3.0-3](#).





**Figure 3.0-3**  
**Point Mugu Sea Range Customers, FY90-95**

The Point Mugu Sea Range is used primarily by the Navy to test guided missiles and other weapons systems, as well as the ships and aircraft that serve as platforms to launch them. The missiles tested at the Sea Range include air-to-air, air-to-surface, surface-to-air, surface-to-surface, and subsurface-to-surface systems. Point Mugu maintains a large array of realistic airborne and surface targets to test these missile systems. Aircraft which fly on the Sea Range usually take off and land at NAS Point Mugu, although some aircraft may fly to the Sea Range from other military bases in California. Aircraft also originate from aircraft carriers during FLEETEXs. Navy ships are often present on the Sea Range for testing of missiles or other systems and for major naval training exercises. Some of these ships and boats belong to NAWCWPNS, while others are stationed at other naval bases and come to the Sea Range for only a few days for testing or training.

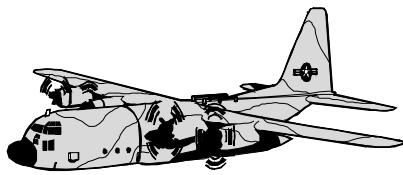
### B - Range Aircraft Activities

#### *Aircraft Types*

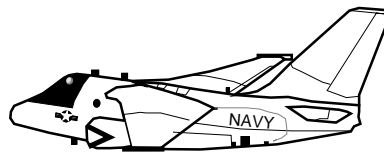
Typical aircraft operating at the Point Mugu Sea Range are shown in [Figure 3.0-4](#). [Table 3.0-2](#) provides performance data and specifications for typical aircraft.

#### *Typical Flight Routes*

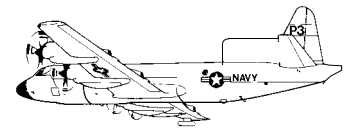
An aircraft sortie consists of a takeoff, the assigned mission, and a subsequent landing. Aircraft sorties typically last only a few hours. The Point Mugu Sea Range is divided into defined areas to allow for multiple events to occur simultaneously and to afford a safety margin for test and training activities. The Control Area Extensions (CAEs) are areas through the Sea Range that are used by commercial and civil aircraft flying on assigned air traffic control routes. The CAEs can be requested and closed by NAWCWPNS when necessary. Standard entry and exit points into the airspace over the Sea Range are not used; however, it is possible to generalize the most commonly used routes and flight patterns.



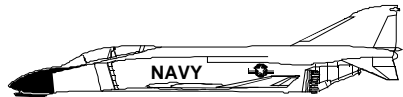
DC-130 Hercules



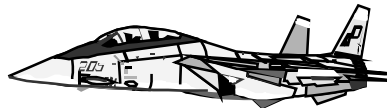
S-3 Viking



NAWCWPNS  
Range NP-3D



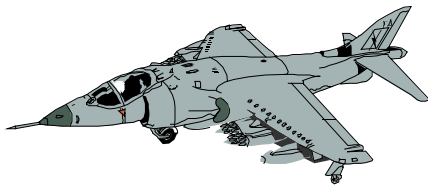
QF-4 Phantom



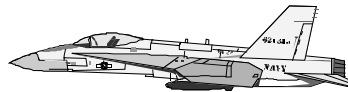
F-14 Tomcat



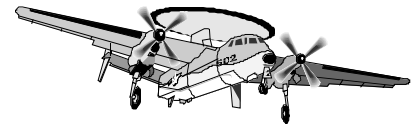
Fleet P-3 Orion



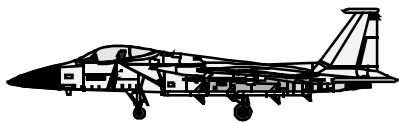
AV-8B Harrier



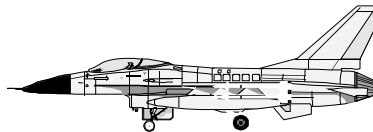
F/A-18 Hornet



E-2C Hawkeye



F-15 Eagle



F-16 Falcon



Convair 580  
on San Nicolas Island

5335



Figure 3.0-4  
Typical Aircraft Types Operating at the Point Mugu Sea Range



Table 3.0-2. Common Aircraft Types Used on the Sea Range

Type	Jet-Engine Aircraft					Turboprop Aircraft <sup>1</sup>		
	F-14	F/A-18	S-3	AV-8B	QF-4	NP-3D	DC-130	E-2C
Nickname	<b>Tomcat</b>	<b>Hornet</b>	<b>Viking</b>	<b>Harrier</b>	<b>Phantom II</b>	<b>Orion</b>	<b>Hercules</b>	<b>Hawkeye</b>
Mission	Fighter	Fighter/Attack	Anti-Submarine Warfare	Fighter/Attack	Target/Target Launch A/C	Sea Surveillance Data Relay	Target Launch Aircraft	Surveillance and Control
Maximum Speed High Altitude	Mach 2.34 1,342 knots	Mach 1.8 1,030 knots	480 knots	700 knots	Mach 2.1 1,200 knots	411 knots	325 knots	323 knots
Maximum Speed Low Altitude	800 knots		440 knots	590 Knots	600 knots	200 knots Search	300 knots	311 knots
Approach Speed	134 knots	134 knots	110 knots	130 knots 0 knots	136 knots	135 knots	105 knots	103 knots
Number of Engines	2	2	2	1	2	4	4	2

<sup>1</sup> The Convair 440 (see [Figure 3.0-4](#)) is a 2-engine turboprop aircraft used to shuttle passengers between NAWS Point Mugu and San Nicolas Island.

Source: Polmar 1997.

Figure 3.0-5 depicts typical entry routes into the range, flight routes within the range, the two standard airborne target recovery areas, and the typical missile launch point west of San Nicolas Island.

### C - Range Ship Activities

#### *Ship Types*

The main vessel types include range project boats (e.g., tugs, QST-35 [target boats]), range support boats (e.g., aviation rescue boats), and project ships (e.g., self defense test ships, destroyers, cruisers, aircraft carriers, frigates, submarines, etc.). Typical Navy ships operating at the Point Mugu Sea Range are shown in Figure 3.0-6.

#### *Typical Ship Routes*

A sortie by a ship or boat is similar to an aircraft sortie, although not generally referred to as a sortie. It can be considered an event, a vessel leaving port, accomplishing its assigned mission, and returning to port. While aircraft sorties last only a few hours, ship events can last from a few hours to several days. The smaller support ships or boats are fuel limited and generally do not have crew accommodations to allow for an extended stay afloat on the Sea Range. The larger vessels (e.g., major Naval combatants) can remain on the range for extended periods either for testing activities or training exercises. Typical routes used by surface ships, support boats, and surface targets are shown in Figure 3.0-7.

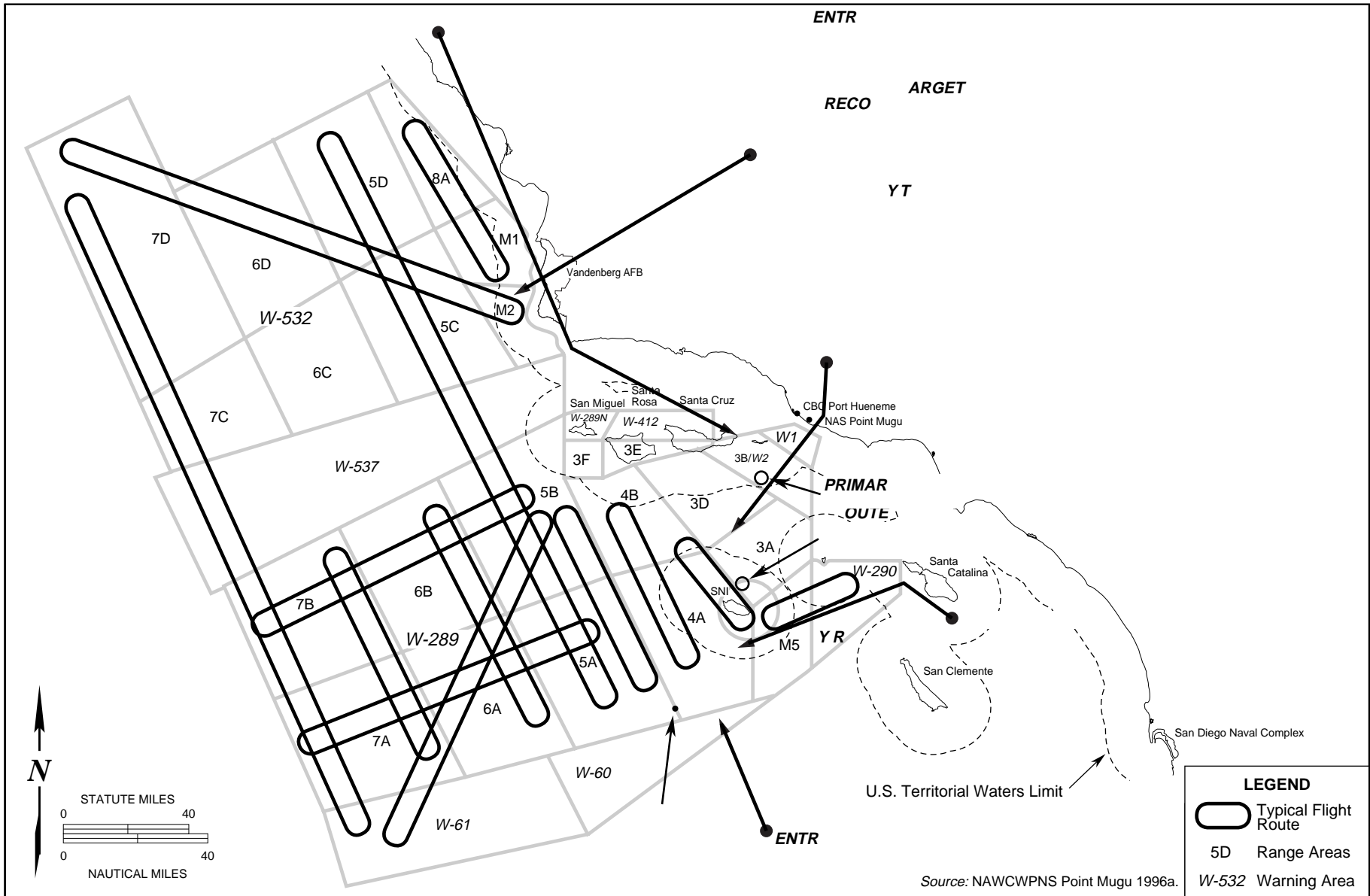
### D - Targets

#### *Airborne and Surface Targets*

Testing missiles on the Sea Range requires a large array of realistic targets. Point Mugu provides a group of targets for this purpose. Typical airborne targets used on the Sea Range are shown in Figure 3.0-8. The airborne target systems include small jet powered aircraft (15 to 20 feet [5 to 6 m] long), supersonic missiles, and Navy fighter aircraft, the QF-4, which can be flown via remote control from the ground (a rotary wing aircraft target, the QUH-1, is also used on the range). Most target systems are not destroyed during missile testing and are recovered for reuse. Because airborne targets are expensive, the concept of “near-miss” is used to facilitate target recovery and reuse. A planned and programmed “near-miss” allows for the evaluation of an airborne weapon system (i.e., a near-miss is scored as a successful intercept) while preserving the airborne target for subsequent tests. The airborne targets can be launched from aircraft or from surface launch sites at NAS Point Mugu or San Nicolas Island as described below. Surface targets are also used extensively on the Sea Range. These targets range in size from small, towed floating boats that simulate radar signatures of large vessels to ex-Navy destroyers which are remotely controlled while on the Sea Range. These large ship targets, like most airborne targets, are not destroyed during testing and are designed for continued use.



3.0-12



Source: NAWCWPNs Point Mugu 1996a.



Figure 3.0-5  
Typical Flight Routes



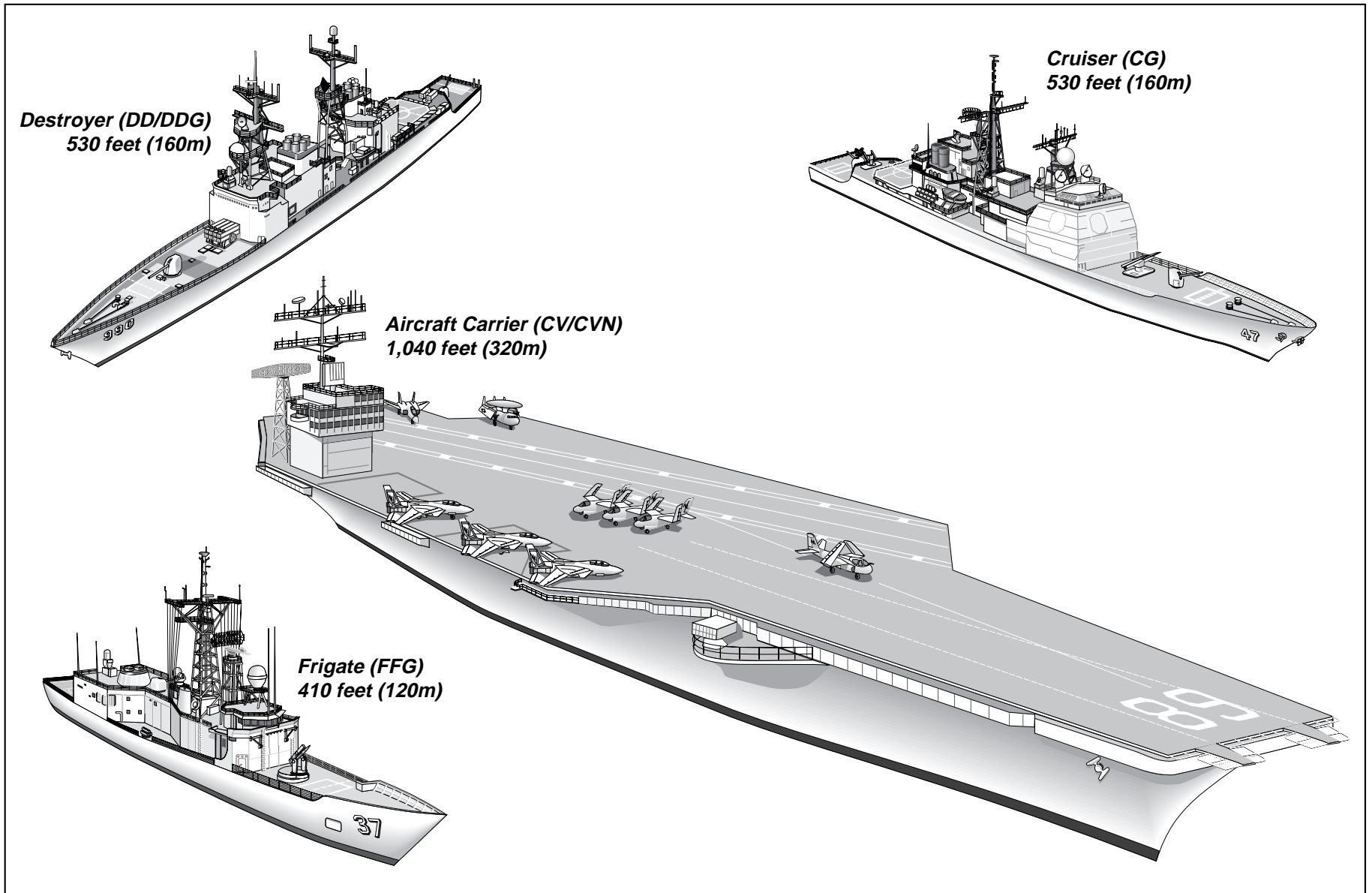


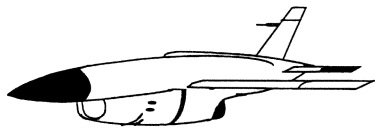
Figure 3.0-6  
Typical Navy Ships Operating on the Point Mugu Sea Range





Sources: NAWCWPNs Point Mugu 1996m; BMDO 1994.

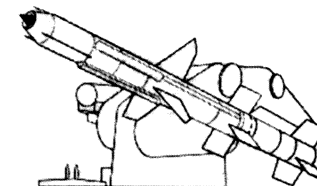
### AERIAL TARGETS



**BQM-34**  
23 feet (7 m)



**QF-4**  
58 feet (18 m)



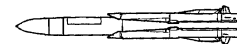
**MQM-8 (Vandal)**  
25 feet (8 m)



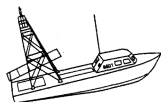
**BQM-74**  
13 feet (4 m)



**AQM-37**  
12 feet (4 m)



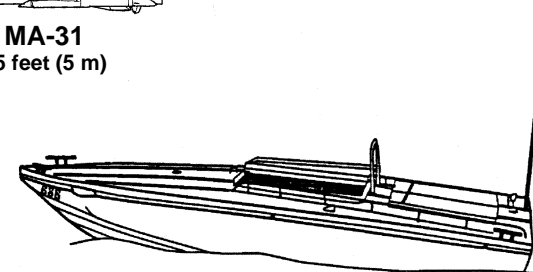
**MA-31**  
15 feet (5 m)



**QST-35**  
18 feet (5 m)

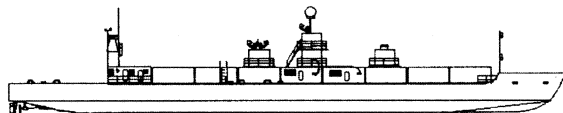


**HSMST**  
23 feet (7 m)

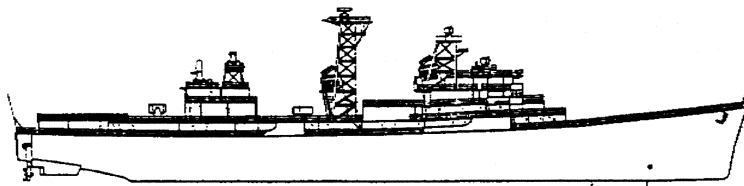


**QST-33**  
56 feet (17 m)

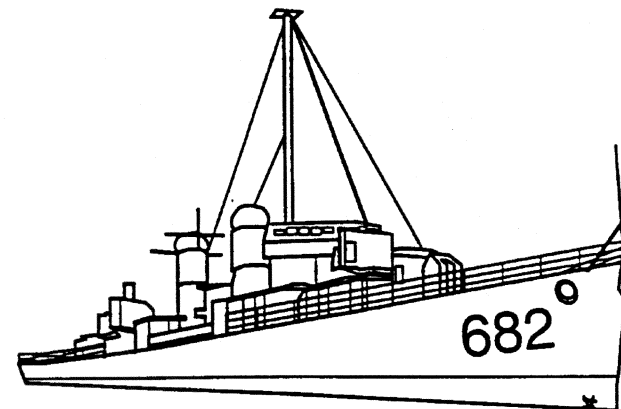
### SURFACE TARGETS



**MST**  
260 feet (80 m)



**SDTS**  
500 feet (150 m)



**Hulk**  
380 feet (120 m)

3.0-15



Figure 3.0-8  
Targets Used at Point Mugu Sea Range



### Surface Target Launches



Target Launch at NAS Point Mugu

NAS Point Mugu. Targets are launched from the NAS Point Mugu Building 55 Launch Complex (refer to [Figure 2-3a](#)). Targets launched from this location include BQM-34s and BQM-74s. These targets require use of a jet assisted takeoff (JATO) bottle. This metal alloy bottle contains solid rocket propellant which, when ignited, provides initial thrust necessary until its turbojet engine can propel the target independently. The bottle falls off soon after the launch and typically lands 700 to 1,400 feet (210 to 420 m) in front of Building 55. A BQM-74C target uses two smaller JATO bottles per launch; other targets typically use only one bottle per launch. NAWCWPNS Point Mugu has established a program to recover JATO bottles.

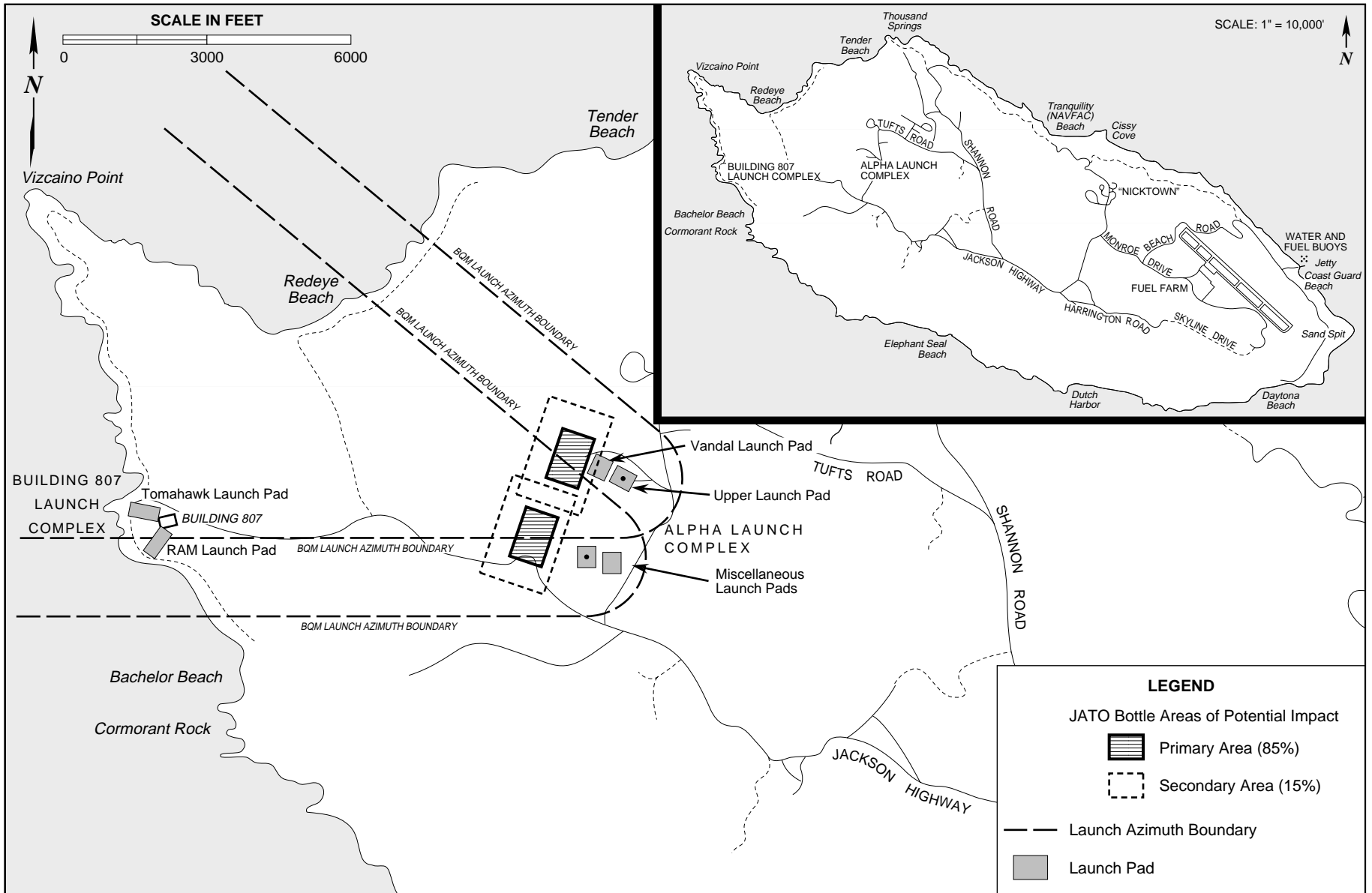
Missiles are also launched from a truck placed directly in front of the Building 55 Launch Complex. The truck launcher is self-contained and is onsite only for the launch duration. Approximately six missiles per year are launched from this location. JATO bottles are not used for these launches.

San Nicolas Island. San Nicolas Island has two launch areas which can accommodate the launch of targets on the Sea Range (see [Figure 3.0-2](#)). The Alpha Launch Complex is normally used for launching the MQM-8 Vandal and the BQM-74 targets. These targets are fired to the northwest into a 45-degree azimuth launch cone; the heading is normally about 270 degrees (to the west) and the JATO bottles typically land 700 to 1,400 feet (210 to 420 m) past the launch pad ([Figure 3.0-9](#)). The Vandal is the largest target launched from this location. The Vandal crosses the beach about 4.75 seconds after launch at high subsonic speeds.

The other launch area at San Nicolas Island is the Building 807 Launch Complex on the southwest coast of the island and is used to launch both targets and other missiles: Tomahawk, Rolling Airframe Missile (RAM), and Special Engineering Test Targets. Its launch azimuth is approximately 30 degrees wide and is oriented toward the southwest. Targets launched from each of these areas cross the coast at high subsonic airspeeds and normally under 1,500 feet (460 m) above sea level.

### E - Environmental Planning

Safety and environmental management are integral parts of the range operations planning process. NAWCWPNS has established a single point of contact for environmental planning: the Land, Sea, Airspace and Environmental Management Office (LSAEMO). The Program Manager, range customer, and LSAEMO form a team that develops a complete project description of each new test or training proposal and requests initiation of an environmental review of the proposal with the Environmental Review Board (ERB). The ERB is composed of personnel from the legal staff and the NAWS, China Lake Environmental Project Office. An analysis of the project is conducted to evaluate the potential environmental impacts associated with the proposed activity, and the ERB recommends the appropriate level of National Environmental Policy Act (NEPA) documentation required for each project. The ERB evaluation is conducted in accordance with Department of the Navy Procedures for Implementing NEPA (32 C.F.R. 775). This is done as early as possible in the planning stage of project development.



**Figure 3.0-9**  
**BQM Target Launch Site at San Nicolas Island**



## F - Safety

### Missile Safety Areas

Table 3.0-3 lists the general types of missiles fired on the Point Mugu Sea Range. Scale representations of these missiles are shown in Figure 3.0-10. Missiles fired on the Sea Range are designed to intercept an airborne or surface target. The three general types of safety areas for missiles include: 1) the clearance area, 2) the safety hazard pattern, and 3) the missile debris pattern. These three safety areas are described below.

**Table 3.0-3. Typical Missile Types Used on the Point Mugu Sea Range**

Missile Designation	Missile Name
AIM/RIM-7	Sparrow
AIM-9	Sidewinder
AIM-54	Phoenix
AIM-120	Advanced Medium-Range Air-to-Air Missile (AMRAAM)
AGM-84	Harpoon; Standoff Land Attack Missile (SLAM)
AGM-65	Maverick
AGM-88	High Speed Anti-Radiation Missile (HARM)
AGM-154	Joint Standoff Weapon (JSOW)
RIM-116A	Rolling Airframe Missile (RAM)
SM-1 and 2	Standard Missile
MIM-23B	I-Hawk
FIM-92	Stinger
RGM-84 and UGM-84	Harpoon
RGM-109 or UGM-109	Tomahawk

### Clearance Areas

The clearance area is the largest of the three general missile safety areas. The clearance area includes the entire range areas that contain the safety hazard pattern (described below). The clearance areas provide an additional safety buffer since the entire safety hazard and missile debris patterns are contained within their boundaries, as well as the areas outside the patterns but within the range areas.

### Safety Hazard Patterns

A safety hazard pattern is the maximum surface area that could be endangered by a missile if it does not follow its prescribed flight path. Each pattern shows the maximum down-range and cross-range distance that the missile could reach during flight. The patterns are specific to each missile and vary by altitude at launch (i.e., a missile will have both a greater down-range and cross-range distance when launched from a higher altitude). The safety hazard pattern is based on the assumption that the missile is unguided at launch. The safety hazard pattern is a smaller subset of the clearance area.

### Missile Debris Patterns

Debris patterns are different than safety hazard patterns. A debris pattern is the area that is exposed to the potential impact of falling pieces of a missile or a target as the result of an intercept. Therefore, the debris pattern for a given test is a smaller subset of the safety hazard pattern and is located within these boundaries. When a missile strikes a target, or achieves a near miss, the size of the debris pattern is

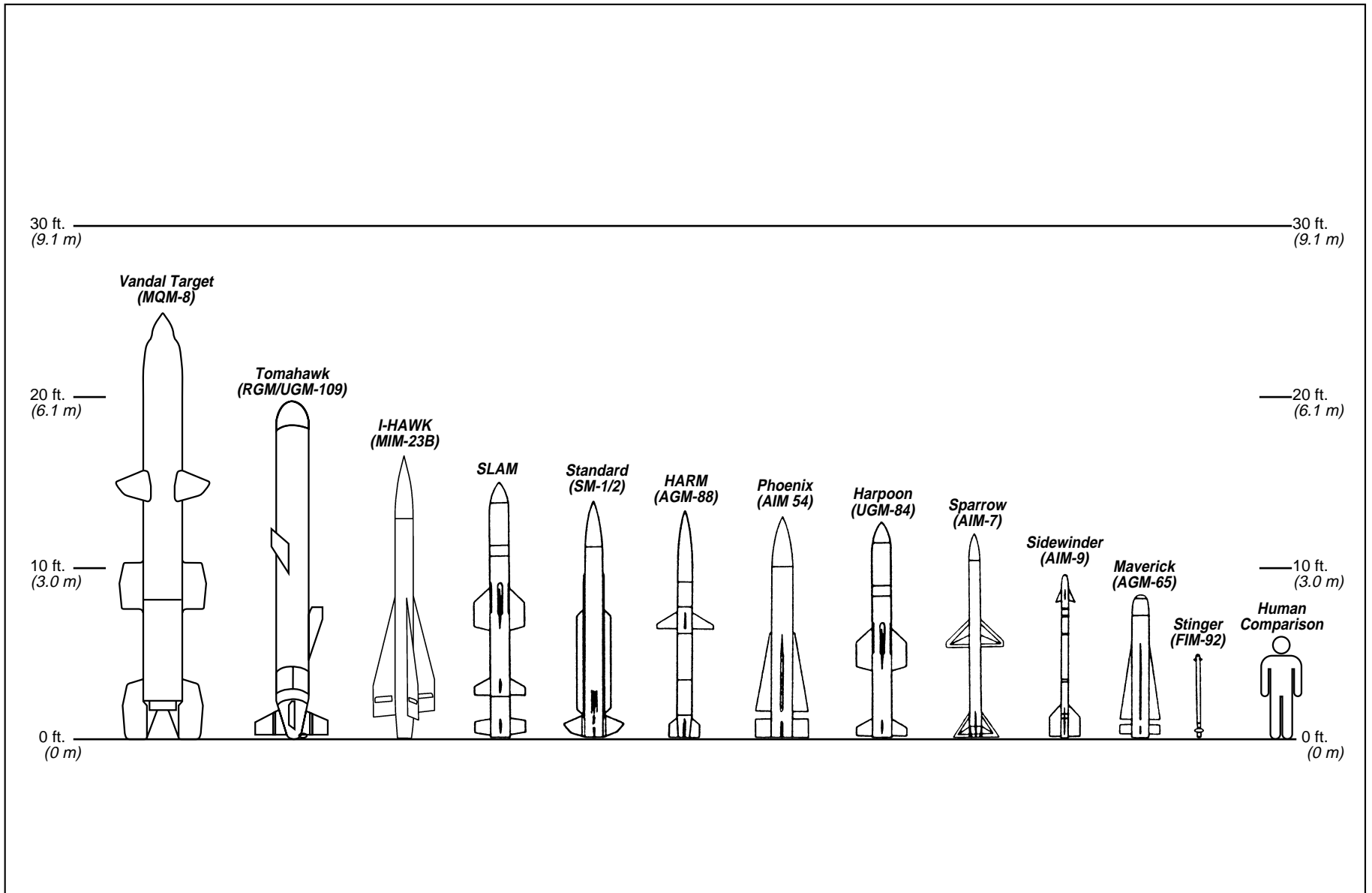


Figure 3.0-10  
Typical Missiles Used at Point Mugu Sea Range



dependent on the altitude, angle, and speed of the intercept. Typically, the higher the altitude, the larger the debris pattern.

Another factor influencing the size of the debris pattern is the size of the pieces resulting from the intercept; smaller pieces of debris will disperse farther than larger pieces. In the case of a warhead shot, for example, the debris is generally extremely small in size and may be dispersed over a very large area. On the other hand, in the case of a planned near-miss, the missile may be programmed to fall to the water intact, resulting in a very small debris pattern (in this case the target would be programmed to fly back to a recovery area for reuse). Debris patterns are always contained within the safety hazard pattern of the test missile.

In addition to a direct hit, many of the missiles used on the Sea Range are equipped with a Flight Termination System (FTS), a system used to destroy a missile in flight. Most missiles used on the range are not equipped with warheads but have an FTS (see FTS description in the following section). Some of these systems use an explosive charge to destroy the missile at any time during the operation. If the FTS is exercised at a high altitude, the extent of the debris dispersion can be very wide, depending on the prevailing winds and the size of the missile fragments. Should the FTS be used at low altitude, the debris pattern is much more limited in size due to the shorter time that variables (e.g., altitude, wind, fragment size, etc.) have to influence the debris footprint. Even if an FTS is used to destroy a missile in flight, the debris pattern is always contained within the larger safety hazard pattern.

#### *Range Safety Policy and Procedures*

The Range Safety Office is the principal advisor and coordinator on all aspects of T&E range safety procedures concerning flight and concerning explosive, toxic, and radiation hazards related to weapons, targets, and other unmanned vehicles launched for programs conducted on the Point Mugu Sea Range. The Sea Range safety policy, procedures, and guidance are provided in NAWCWPNS Instruction 5100.2 dated July 9, 1993. This document defines range safety requirements, criteria and the safety planning process, and operational procedures. Although the commander of NAWCWPNS has the ultimate responsibility for range safety, the authority for execution of these safety programs is delegated to the Sea Range Safety Officer in the Range Safety Office. Every precaution is implemented in the planning and execution of all operations resulting in the launching of missiles on the Sea Range to prevent injury to human beings or damage to property.

Range Surveillance and Clearance. The Sea Range safety program establishes procedures and approval authorities to ensure that safety hazard patterns and impact areas are kept clear of non-participating aircraft and ships. Inherent in this responsibility is the close coordination with controlling agencies for both air and surface traffic over and on the Sea Range. NAWCWPNS issues notices to airmen (NOTAMs) and mariners (NOTMARs) to notify non-participants 24 hours in advance of planned testing and training activities on the Sea Range. Furthermore, a system has been established whereby commercial vessels entering the Sea Range establish contact with NAWCWPNS safety personnel. If the vessel's route will intersect any portion of the established clearance area, the vessel is advised either to increase or reduce their speed accordingly in order to ensure safe separation.

Flight Termination. Safety policy establishes clear guidelines and procedures for flight termination, when required, for missiles fired on the Sea Range. Generally, an FTS is required when a missile or any portion or stage of a missile possesses the capability to exceed its designated impact limits. An FTS is capable of terminating thrust or aerodynamic lift; it can also destroy the missile at any point during the powered portion of its flight. Three methods of flight termination are used about equally on the Sea Range: 1) dive the vehicle into the water, 2) command recovery, and 3) explode the fuel tank. The FTS

method is dependent on the type of missile involved. For liquid propelled missiles, flight termination action causes engine shutdown and zero thrust by fuel dispersion or intermixing. For solid propellant missiles, a condition of zero thrust is imposed, and any residual thrust causes the vehicle to tumble. For aerodynamic missiles, flight termination creates a condition of zero lift by separating the wings, the control surfaces, or complete disintegration of the missile. While most of the FTS methods used on the Sea Range do not use an explosive charge, if used for FTS, the weight of the charge is dependent on the size of the missile. In all cases, the vehicle is destabilized or severed into the minimum number of pieces required to produce tumbling.

The altitude at which the FTS is used varies considerably, from sea level to the missile's maximum operational altitude. Flight termination is normally initiated by the Missile Flight Safety Officer (MFSO) under the following conditions: 1) if there is an indication of an impact limit violation; 2) if the position of the missile is unknown due to loss of tracking data and the missile has the capability of violating the impact limit; or 3) due to unsatisfactory performance which creates a safety hazard and loss of range safety control. Flight termination thus provides an additional margin of safety for Sea Range operations.

Safety Planning and Documentation. The basic documents for range safety execution are Range Safety Approvals (RSAs) and Range Safety Operational Plans (RSOPs). These documents are prepared by the Range Safety Officer with extensive interaction with the range users. The RSA contains the operational procedures and safety criteria governing the launch of missiles not requiring an FTS. An RSA/RSOP must be prepared for each distinctly different program involving missile flight. The RSA/RSOP may be valid for more than one launch if the launch or missile parameters have not changed. RSAs/RSOPs are suspended or canceled whenever there is a violation of safety criteria. The applicable RSA/RSOP is reinstated only after a thorough review/investigation of the incident leading to the suspension or cancellation. The Range Safety Officer is required to review RSAs/RSOPs on a periodic basis and publish a listing of those that are current and valid.



*NP-3D Performing Sea Surveillance*

Implementing Sea Surveillance and Safety Clearance. NP-3D aircraft assigned to the Weapons Test Squadron at Point Mugu provide sea surveillance and range safety clearance of test areas on the Sea Range and also act as airborne platforms for data telemetry, collection, and/or relay. These missions provide range safety clearance on the Outer Sea Range beyond the range of the sea surveillance radars on the Channel Islands and at Laguna Peak near Point Mugu. For missile firing missions or other hazardous operations

in the Outer Sea Range, the NP-3Ds are used to implement the following safety procedures:

1. takeoff from NAS Point Mugu and proceed to the selected area of the Sea Range;
2. conduct a radar and visual search of the planned test area from 4,000 feet (1,220 m) MSL (this altitude provides about 100 nautical miles [NM] [190 km] of radar coverage);
3. upon contact with a surface vessel, attempt to communicate with the captain or crew via FM radio;
4. warn the crew of the impending test and advise them to move out of the affected test area;
5. if unable to establish radio contact, the aircraft descends to low altitude over the boat (approximately 500 feet [150 m]);



6. attempt to get the attention of the crew by visual means while still trying to establish radio contact;
7. advise the crew of the hazards of their position on the Sea Range and monitor the vessel as it leaves the area;
8. communicate range clearance to Range Operations.

If the area cannot be cleared, the operation is delayed or moved to an area that is clear. After the test area is cleared of all non-participating surface vessels, the NP-3D climbs to a higher altitude (5,000 to 8,000 feet [1,520 to 2,440 m] MSL) to perform its secondary mission of telemetry data collection and relay. Telemetry may consist of both electronic and photo-optical data collection. The return flight to NAS Point Mugu is typically at 5,000 feet [1,520 m] MSL. [Figure 3.0-11](#) shows typical sea surveillance routes flown on the Point Mugu Sea Range.

### G - Recovery Areas



*Typical Target Recovery*

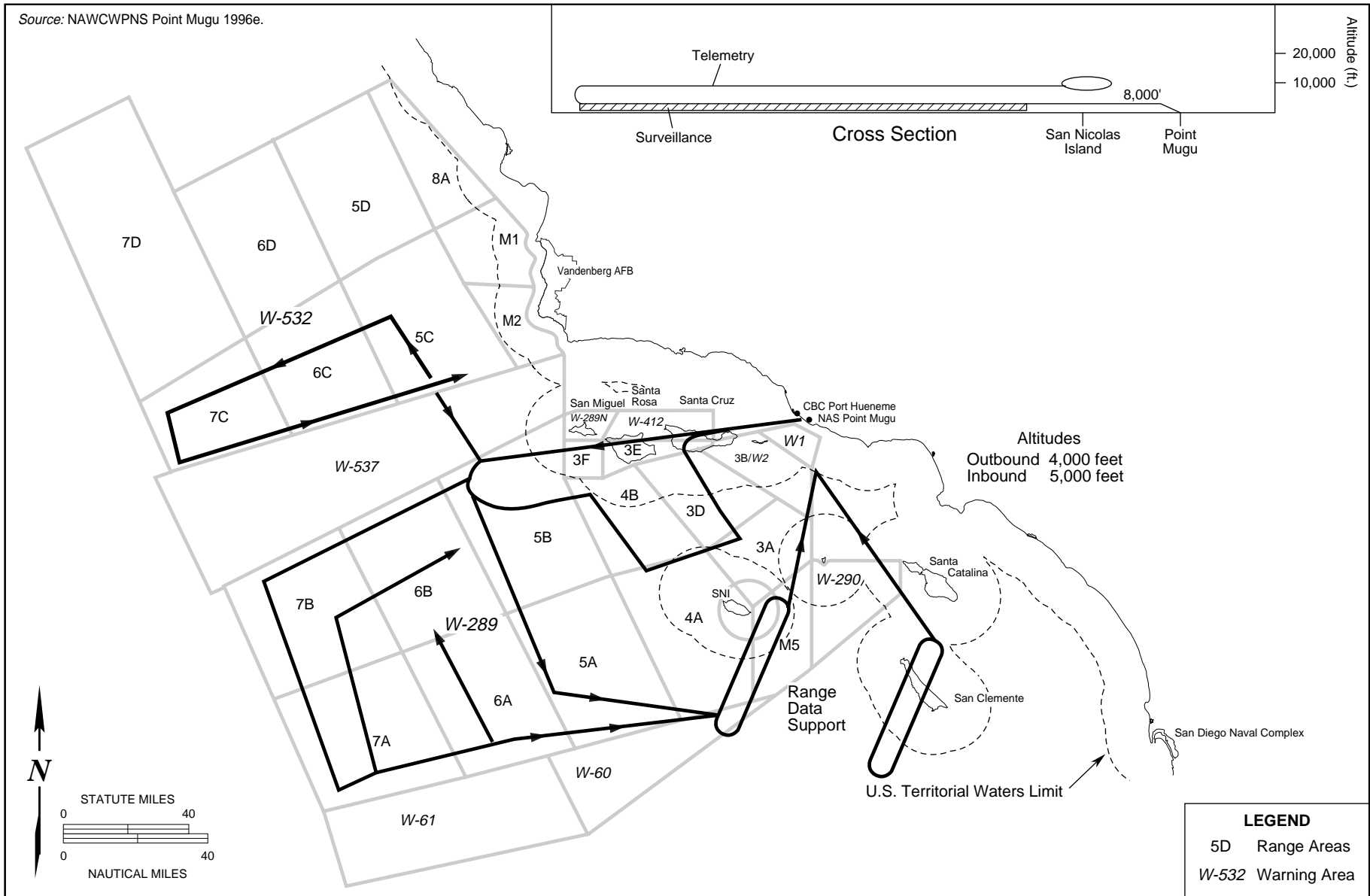
Some airborne targets are not recoverable (e.g., MQM-8 Vandals and AQM-37s); however, many other types of airborne targets are recoverable. Target retrieval is required depending on the type of target used. Helicopters are typically used for recovery operations. However, boats can be used when a drone cannot be safely transported to NAS Point Mugu by helicopter. Most of the missiles fired on the Sea Range do not carry live warheads, and unless a target sustains a direct hit from a missile, it is flown to a designated recovery area. A recovery parachute is remotely deployed, and the target is recovered from the water by a Navy team aboard a boat or helicopter. The Sea Range has two standard recovery areas; the primary recovery area is located approximately 10 NM (19 km) south of Anacapa Island and the secondary recovery area is located 6 NM (11 km) north of San

Nicolas Island (see [Figure 3.0-5](#)).

#### 3.0.2.2 Test Scenarios on the Point Mugu Sea Range

The Point Mugu Sea Range is the Navy's primary ocean testing area for guided missiles and related ordnance. Most testing of missiles and activities on the Sea Range fall into five general categories, or scenarios. These scenarios, which depend on the missile and target characteristics of the test articles, consist of the following: air-to-air, air-to-surface, surface-to-air, surface-to-surface, and subsurface-to-surface. [Table 3.0-4](#) provides a summary of current test scenario activities at the Point Mugu Sea Range. This matrix shows typical test participants, locations, and conditions for each of the scenarios. However, since some tests may require flexibility that is not shown in the data, [Table 3.0-4](#) does apply inclusively to all operations in the Sea Range.

Each of the scenarios is described below in four subcategories: General (provides overview of the scenario), Examples (provides specific example), Safety, and Recovery.



**Figure 3.0-11**  
**Typical Sea Surveillance Flight Profile**



Table 3.0-4. Test Scenario Matrix<sup>1</sup>

	Air-Air	Air-Surface	Surface-Air	Surface-Surface	Subsurface-Surface
<b>Launch Operations per Year (FY91-95)*</b>	58 (35%)	55 (33%)	33 (20%)	16 (10%)	3 (2%)
<b>Estimated Aircraft Sorties in Launch Ops per Year</b>	1,379	74	394	69	6
<b>Missiles Fired-Baseline Year**</b>	170***	20	85	39	0
<b>Typical Participants</b>	F/A-18, F-14, F-16, F-15 Helicopters	F/A-18, EA-6B AV-8B P-3, S-3 Helicopters	Cruiser, FFG Ground-Base Destroyer, CV Landing Ship	Cruiser Destroyer Ground-Base	Submarine
<b>Missiles</b>	Phoenix Sparrow Sidewinder AMRAAM	Harpoon HARM Maverick JSOW SLAM	Sea Sparrow Standard Stinger I-Hawk RAM	Harpoon Tomahawk SSM-1	Harpoon Tomahawk
<b>Targets</b>	BQM-74E MQM-8 AQM-37 BQM-34 MA-31	QST-35 & 33 Barge MST Hulk San Nicolas Island (west end)	BQM-74 MQM-8 AQM-37 BQM-34 Banner Vandal MA-31	QST-35 QST-33 Hulk MST	Hulk Barge MST
<b>Target Launch Platforms/Areas</b>	DC-130 QF-4 NAS Point Mugu San Nicolas Island	None	DC-130 QF-4 NAS Point Mugu San Nicolas Island Ships	None	N/A
<b>Targets Launched</b>	182	132	103	40	2****
<b>Targets Recovered</b>	104	85	59	26	2****
<b>Typical Engagement Areas</b>	4A, 4B, 5A, 5B, 6A, 6B, 6C	3D, 4A, 4B	3A, 3D, 4A, 4B	W1, W2, 3B, 3D, 4B	3D, 4B, M3
<b>Typical Duration</b>	1.5 hours	1.5 hours	2 hours	2 hours	3 days
<b>Support Aircraft</b>	KC-135 NP-3D E-2C Contract Helo	NP-3D S-3	Contract Helo	NP-3D	P-3 S-3 H-60 Helo
<b>Support Boats</b>	Range Support Boats	Range Support Boats	Range Support Boats	Range Support Boats	Range Support Boats Contractor

<sup>1</sup> The data in this table provide information on the major types of testing activities that occur on the Point Mugu Sea Range.

\* Based on NAWCWPNS Range Scheduling Statistical Report. FY = Fiscal Year (i.e., October 1 through September 30).

\*\* 351 missiles were fired on the Sea Range in the baseline year. The differences in the total in this table are due to some missiles being categorized as "other" and the remaining number are from classified projects.

\*\*\* 30 of these air-to-air missile firings occurred during FLEETEXs.

\*\*\*\* No subsurface-to-surface missiles were fired in the baseline year; these numbers represent an annual average between FY91-95.



## A - Air-to-Air Tests

### *General*



*F/A-18 Firing Sidewinder Missile – Air-to-Air*

The air-to-air scenario involves testing weapons that support the Navy's mission of air warfare. A typical air-to-air scenario involves the test and evaluation of an airborne weapon system (e.g., a test missile fired from a fighter aircraft against an airborne target). The test missiles are highly instrumented to record the intercept parameters and usually do not carry live warheads. The airborne targets are not normally destroyed (unless there is a direct hit) and are recovered by boat or helicopter from the water for subsequent reuse. Test missiles are destroyed prior to impact with the water and are not normally recovered.

Most testing under this scenario involves captive-carry flight testing using an inert missile that is not fired. A "captive-carry" sortie involves an aircraft carrying inert missiles equipped with telemetry devices to simulate carrying and firing live ordnance. However, some scenarios involve configuring a missile with telemetry and a booster for launch and data gathering. Others require the actual firing of a live air-to-air missile at an airborne target. The missiles do not always physically strike the target. However, when missile impacts do occur they are at about 20,000 to 30,000 feet (6,100 to 9,100 m). (See [Table 3.0-4](#) for a summary of the frequency and components of air-to-air testing, as well as other test scenarios.)

### *Examples*

[Figure 3.0-12](#) displays a representative air-to-air scenario for an F/A-18 launch of a Sparrow missile using a BQM-74 target that is air-launched from a DC-130 range aircraft. Target retrieval following the test or operation is conducted by a range or contractor helicopter, and a range boat is used for backup target recovery. All participants take off and land from NAS Point Mugu.

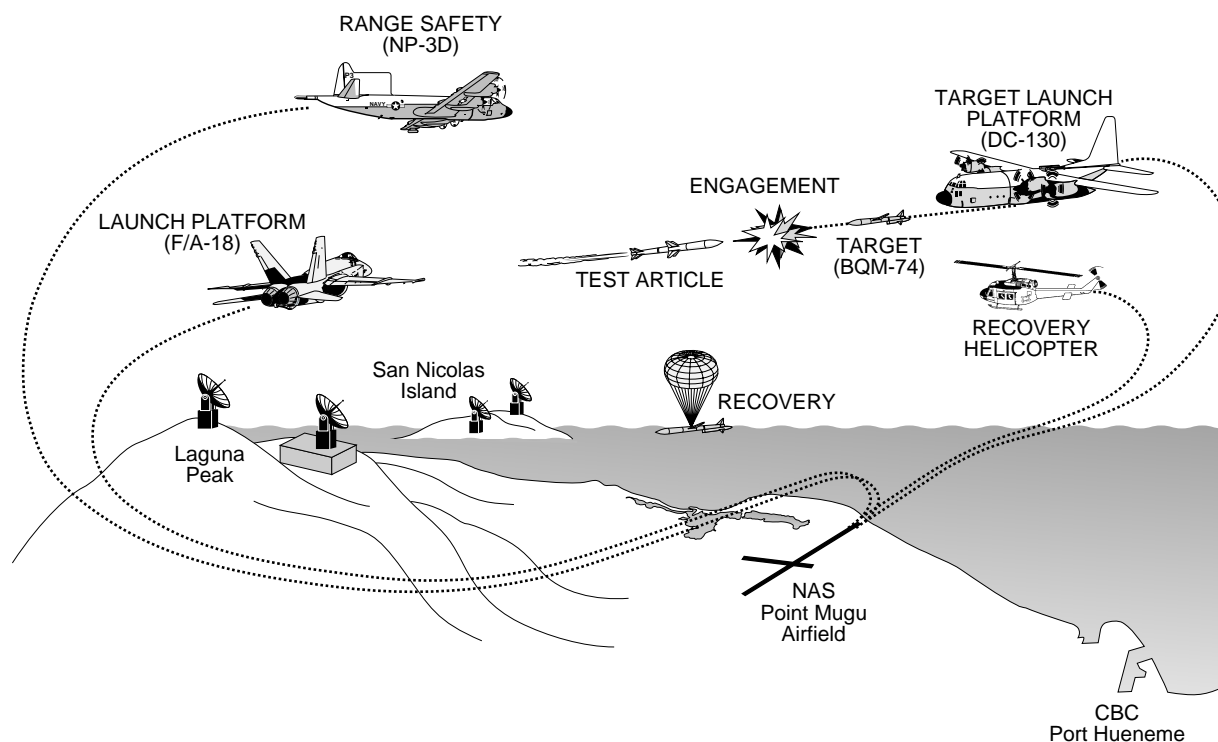
Targets for captive-carry tests usually are manned aircraft since the missiles are not launched. For air-to-air tests that require missile launching at an actual target, these targets can be unmanned, full-scale aircraft (QF-4); subscale, subsonic, surface- or air-launched targets (subsonic BQM-34, BQM-74, Ballistic Aerial Target System [BATS]); an air-launched supersonic target (AQM-37); or the supersonic land-launched MQM-8G (Vandal).

Command and control of all range participants, data gathering, and range safety are performed for each air-to-air scenario.

### *Safety*

Safety of personnel, aircraft, and ships is the primary priority for all Sea Range activities. Prior to any live firing of missiles or ordnance, range safety officials ensure that the range areas are clear of non-participating aircraft or ships. Every practical effort is made to keep non-participating boats and aircraft out of the safety hazard pattern. This is done by establishing Restricted and Warning Areas, publishing NOTMARs and NOTAMs, and maintaining close coordination with agencies controlling





**Figure 3.0-12**  
**Representative Air-to-Air Scenario**

aircraft and surface traffic. Prior to any hazardous activity, the projected impact areas are surveyed by Range Safety aircraft. Each missile has a safety hazard pattern, which is the surface area that could be endangered by the missile if it does not follow its prescribed flight path. Safety hazard patterns for selected Navy missiles are shown in Appendix B. The debris pattern for a given test is a smaller subset of the safety hazard pattern and is located within these boundaries. If non-participating ships or aircraft are in the impact area, these individuals are warned of the impending hazard and asked to leave. If the area cannot be cleared, the tests or training events are delayed until the area is clear or the event is moved to a clear area. Prior to any live firing of missiles or ordnance, range safety officials ensure that the range areas are clear of non-participating aircraft or ships (see “Safety” in [Section 3.0.2.1-F](#)).

#### *Recovery*

Many of the airborne targets used in the air-to-air scenarios are recoverable. As described in [Section 3.0.2.1](#), helicopters and boats are used for recovery operations. Typically, the primary recovery area 10 miles (16 km) south of Anacapa Island (see [Figure 3.0-5](#)) would be used to recover airborne targets used in the air-to-air scenarios.



## B - Air-to-Surface Tests

### *General*



*F/A-18 Releasing SLAM – Air-to-Surface*

The air-to-surface scenario involves testing weapons that support the Navy's strike/surface warfare mission. These tests often include an aircraft weapon system using a missile, bomb, inert mine shape, or any other object released from an aircraft for attack of an enemy surface target. Free-fall bombs and mine shapes are usually inert, without fusing or explosives, and are used to test the accuracy of a weapon system. Targets for the air-to-surface scenario are floating surface targets or the SLAM target area on the western tip of San Nicolas Island (refer to [Figure 3.0-2](#)). Floating surface targets are usually not sunk and, if struck, are repaired for later use. The missiles

being tested are instrumented for the test, do not normally carry live warheads, and are destroyed on impact with the water. (See [Table 3.0-4](#) for a summary of the frequency and components of air-to-surface testing, as well as other test scenarios.)

### *Examples*

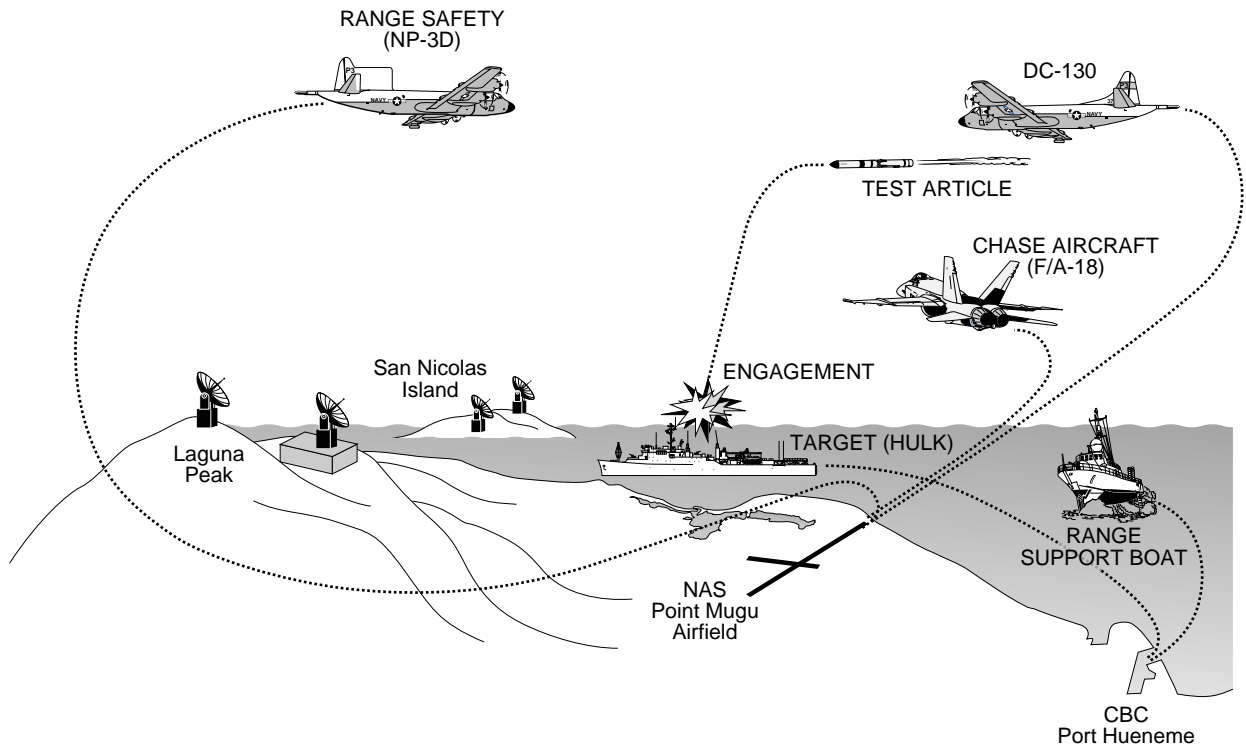
[Figure 3.0-13](#) displays a representative air-to-surface test scenario for a DC-130 launch of an air-to-surface weapon (e.g., Harpoon) against a target hulk. (A hulk is a stripped-down, environmentally clean destroyer or other ex-Navy vessel used as a surface target. A hulk is usually not sunk and, if struck, is repaired for later use). Additional range support involves chase aircraft (e.g., F/A-18), a range support boat, and a tugboat required to place and recover the destroyer hulk on site. The targets in these cases can only be recovered by a towing boat (the seaworthiness of the target following the test determines if it will be recovered).

Targets for this scenario can be seaborne such as remotely controlled powered boats (SEPTARs) like the 56-foot (17-m) QST-35 or the 18-foot (6-m) QST-33, full-scale hulks, the Mobile Ship Target (MST), the Self Defense Test Ship (SDTS), or barges. Targets are typically towed to a desired location on the range and augmentation systems energized (i.e., turned on) by range personnel. These targets can be towed by other boats or operated by remote control by range personnel. The NAWCWPNS Surface Craft and Surface Targets Divisions at Construction Battalion Center (CBC) Port Hueneme provide range support for most of the boat targets and transportation of targets personnel. San Nicolas Island contains a small target area that is used for air-to-surface weapons testing, primarily for the SLAM missile. The target is located on the northwest portion of San Nicolas Island and consists of several stacks of empty shipping containers.

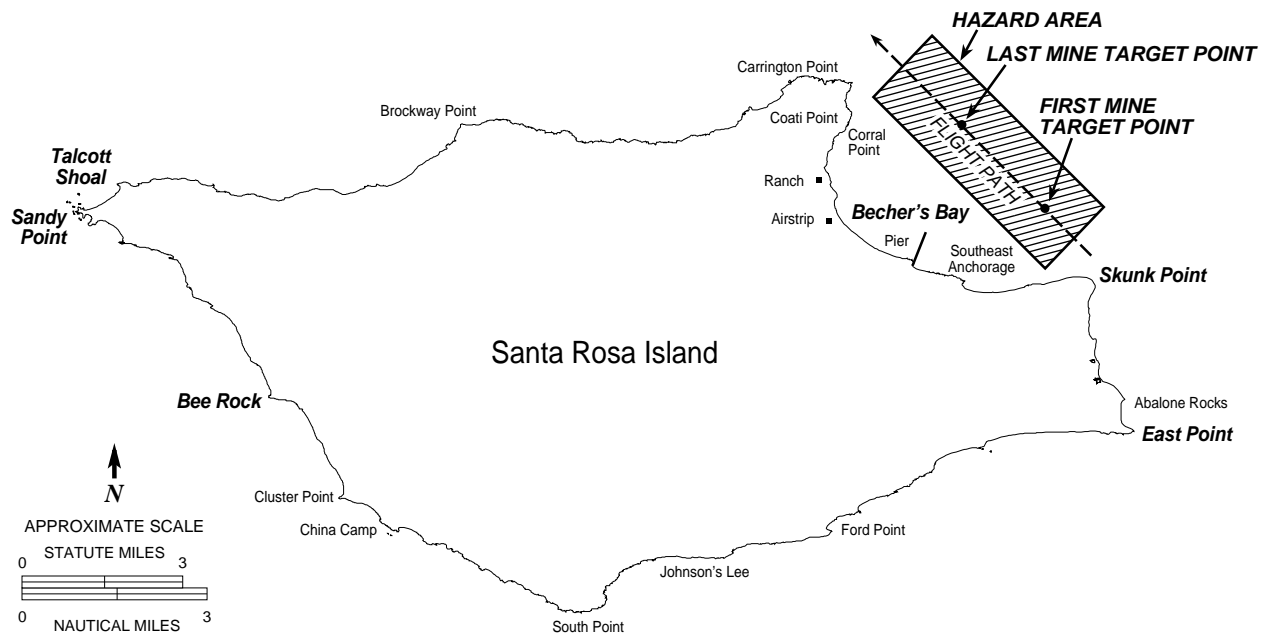
Range support for the air-to-surface scenario is similar to ground and air support used during the air-to-air scenario. However, additional support is required to place and operate towed or self-propelled surface targets.

Another example of an air-to-surface scenario is the inert mine shape drop. During this operation, inert mine shapes (typically pieces of concrete in various shapes or steel casings filled with concrete) are released from aircraft to test the accuracy of a weapon system. The mine shapes are typically dropped in nearshore waters of Becher's Bay off Santa Rosa Island ([Figure 3.0-14](#)) (no Navy activities take place on the island). After the mine shapes are dropped, an EOD team locates them for scoring purposes and recovery. Some of the inert mine shapes are equipped with pingers to facilitate recovery. When





**Figure 3.0-13**  
**Representative Air-to-Surface Scenario**



**Figure 3.0-14**  
**Inert Mine Shape Drop Zone Near Santa Rosa Island**

operating, the pingers produce sound at source levels of approximately 175 dB and at frequencies (approximately 28 to 45 kHz) outside the range of human hearing (i.e., approximately 20 Hz to 15 kHz). The EOD recovery team uses passive acoustic equipment that helps locate the mine shapes based on the strength of the received sounds from the pingers. Once the locations of the mine shapes are determined, they are recovered for future use. Approximately 99 percent of the mine shapes equipped with pingers are recovered; the locations of those without pingers are often not determined and they are therefore not recovered. In the baseline year, 49 inert mine shapes were dropped in Becher's Bay, and approximately 40 percent (about 20) were recovered.

### *Safety*

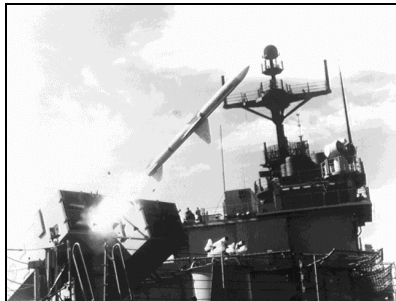
Sea Range safety procedures for this scenario are similar to those described in the air-to-air scenario. In addition, standard clearance procedures are implemented for the west end of San Nicolas Island when SLAM testing occurs there.

### *Recovery*

Floating surface targets are not normally sunk during air-to-surface testing. Most of the surface targets are retrieved by recovery boats.

## C - Surface-to-Air Tests

### *General*



*Sea Sparrow Missile –  
Surface-to-Air*

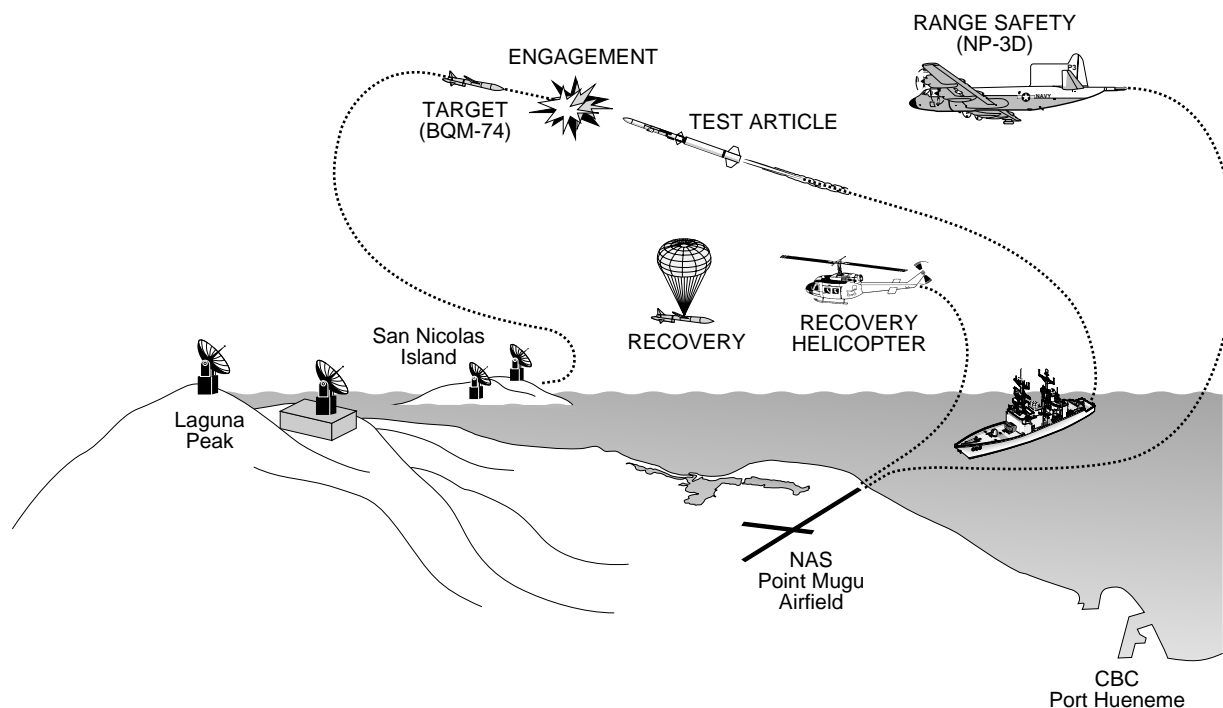
The surface-to-air scenario involves testing weapons that support the air warfare mission. This includes testing a ship's defensive weapons systems for defense against an enemy airborne target or threat. Other surface-to-air scenarios include surface-launched weapons systems and airborne targets. The targets are similar to the air-to-air scenario and are air-launched or surface-launched.

Testing surface-to-air missiles involves Navy ships firing their self defense missiles against airborne targets. Targets used by the Navy in this scenario can be launched from aircraft such as the DC-130 or QF-4 and are recovered when possible. The AQM-37 and MQM-8 Vandal supersonic targets are not recovered and are destroyed either on impact by the test missile or upon water entry. Missile impact altitudes for surface-to-air tests are dependent on the type of missile or target being tested. Altitudes can range from less than 100 feet (30 m) for MQM-8 Vandal targets to 80,000 feet (24,238 m) for AQM-37s. Range support assets are similar to air-to-air and air-to-surface scenarios. (See [Table 3.0-4](#) for a summary of the frequency and components of surface-to-air testing, as well as other test scenarios.)

### *Examples*

[Figure 3.0-15](#) displays a representative surface-to-air test scenario for a ship launching a surface-to-air missile against a subscale BQM-74 launched from San Nicolas Island. Range clearance is performed by a NP-3D Orion, and target retrieval is performed by a contract helicopter. All participants (except the unmanned target) take off from and land at NAS Point Mugu.





**Figure 3.0-15**  
**Representative Surface-to-Air Scenario**



*Phalanx Close-In Weapon System*

Another example of a surface-to-air scenario involves testing a ship's close-in defense systems against high-speed anti-ship missiles. Close-in ship defense systems are considered the last line of defense designed to protect ships from missile attacks. Close-in ship defense systems include a search and track radar, gun, magazine, weapon control unit, and associated electronics, all integrated into a single unit. The gun is hydraulically powered and fires a projectile with a tungsten penetrator. Each firing burst consists of about 200 rounds. The typical missile intercept range is between 2 miles (3 km) and 4 miles (6 km) from the ship. Missile intercept altitudes typically range from about 20 feet (6 m) to 50 feet (15 m) above the water.

The Navy has equipped most ships with close-in defense systems including frigates, destroyers, cruisers, amphibious ships, and aircraft carriers. Testing close-in ship defense systems on the Sea Range involves Navy ships firing the gun against an airborne target. In addition, calibration tests are conducted which do not require the use of targets.



### Safety

Sea Range safety procedures for this scenario are identical to those described in the air-to-air scenario.

### Recovery

Sea Range target recovery procedures are identical to those described in the air-to-air scenario.

## D - Surface-to-Surface Tests

### General



*Tomahawk Missile –  
Surface-to-Surface*

The surface-to-surface scenario involves testing weapons that support the surface warfare mission. In this scenario, a surface vessel fires a missile against a surface target, which is either another ship or a land target. This includes testing of a ship's weapon system using a cruise missile weapon to attack a surface target. The test article can be captive-carry using an inert missile, missile with telemetry and a live rocket, or the actual firing of a live missile (typically during a FLEETEX; see [Section 3.0.2.3](#)). Air support is required from the range to provide chase aircraft and safety procedures are implemented to clear the target operational area.

Other aspects of the test are identical to the air-to-surface scenario.

(See [Table 3.0-4](#) for a summary of the frequency and components of surface-to-surface testing, as well as other test scenarios.)

### Examples

[Figure 3.0-16](#) displays a representative surface-to-surface test scenario for a ship launching a surface-to-surface missile against a target hulk. Additional range support involves the chase aircraft, range support boat, and tug required to position an unpowered target. Recovery of the range targets is similar to that performed for air-to-surface tests.

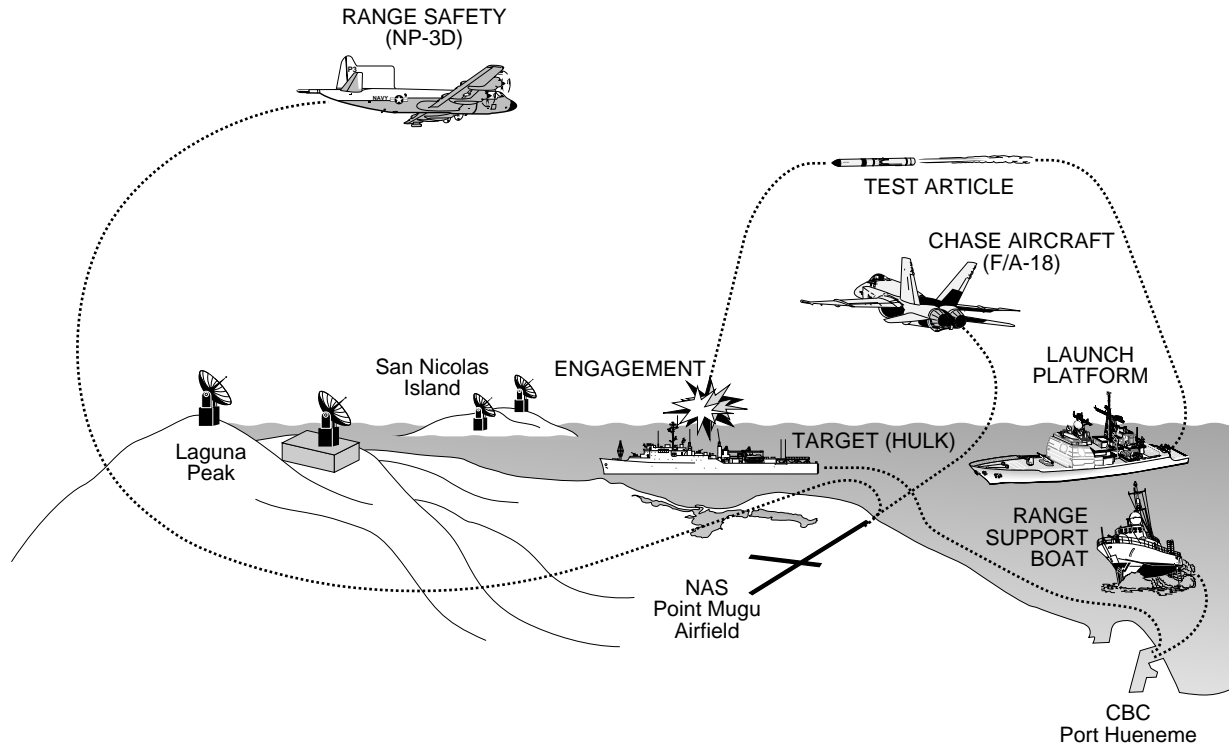
### Safety

Sea Range safety procedures for this scenario are identical to those described in the air-to-air scenario. In addition, extensive safety precautions are taken when surface-to-surface missiles are fired against land targets on San Nicolas Island, including a safety chase aircraft and a termination system which turns off the engine and provides parachute recovery of the missile.

### Recovery

Sea Range target recovery procedures are identical to those described in the air-to-surface scenario.





**Figure 3.0-16**  
**Representative Surface-to-Surface Scenario**

E - Subsurface-to-Surface Tests



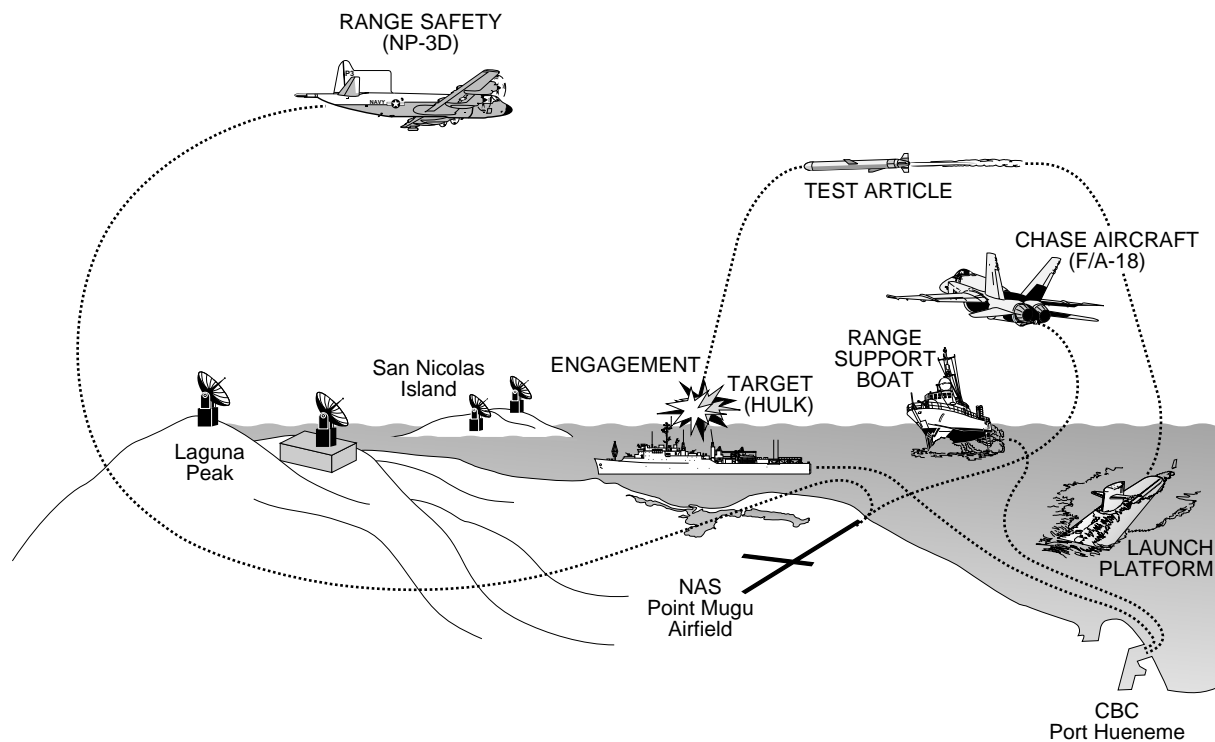
*Tomahawk Missile –  
Subsurface-to-Surface*

*General*

The subsurface-to-surface scenario involves testing weapons that support the strike/surface warfare mission. This includes testing a submarine's weapon system to attack a surface or land target. Missiles are fired from a submarine in the Sea Range at a surface target (hulk) on the Sea Range similar to those discussed in the air-to-surface scenario. The air support required from the range to clear the target operational area and provide chase aircraft is identical to the air-to-surface scenario. (See [Table 3.0-4](#) for a summary of the frequency and components of subsurface-to-surface testing, as well as other test scenarios.)

*Examples*

[Figure 3.0-17](#) displays a representative subsurface-to-surface test scenario for a submarine launching a subsurface-to-surface missile against a surface target. Additional range support involves the chase aircraft, range support boat, and tug required to tow the target into place. Recovery of the surface targets is similar to that performed for air-to-surface tests.



**Figure 3.0-17**  
**Representative Subsurface-to-Surface Scenario**

### *Safety*

Sea Range safety procedures for this scenario are identical to those described in the air-to-air scenario. In addition, extensive safety precautions are taken when subsurface-to-surface missiles are fired against land targets, including a safety chase aircraft and an FTS.

### *Recovery*

Sea Range target recovery procedures are identical to those described in the air-to-surface scenario.

## F - Ancillary Operations Systems

Ancillary Operations Systems are those systems which support routine Sea Range operations. These include systems such as radars, communications, lasers, chaff, and flares that are used in conjunction with the five typical test scenarios described in the previous section.

### *Radar Systems*

Surveillance Radars. NAWCWPNS uses a variety of surveillance radars and display systems to detect and track aircraft and surface vessels on or near the Sea Range. Surveillance radars can provide a complete picture of all of the activity within line-of-sight on the range, including both participants and



non-participants. Continuous monitoring of range traffic allows NAWCWPNS to conduct hazardous operational test and training events involving aircraft flights, missile firings, other weapons employment, and target drone launches without undue danger to the public or non-participating boats or aircraft present on the range. There are several types of surveillance radars used by NAWCWPNS Point Mugu. They are distinguished by their location, surveillance area, and targets. These radars are located at NAS Point Mugu, Laguna Peak, San Nicolas Island, Santa Cruz Island, or aboard an airborne platform such as a NP-3D. Their surveillance areas can extend as far as 200 NM (370 km) from the site. NAWCWPNS surveillance radars typically operate at powers ranging from 250 kW to 1,000 kW (or 1 MW) (NAWCWPNS Point Mugu 1997b). Frequencies range from 1,300 MHz to 2,800 MHz.

Metric Radar and Other Systems. Metric radar systems are distinctly different from the surveillance systems. The metric tracking systems produce electronic data to generate time, space, and position information (TSPI). TSPI data are sent to the Range Data System for real-time tracking and operational control. The TSPI system uses both onboard transponder equipment (which is interrogated by the radar) or radar skin track only. The Sea Range tracking systems include metric tracking radars, Multilateration Operations Control System (MOCS), Range Joint Program Office (RAJPO) Global Positioning System (GPS), and photo-optical instrumentation. The Sea Range metric radars provide precise tracking of range operations participants using four radars at NAS Point Mugu and four at San Nicolas Island. MOCS is capable of tracking over 60 participants from sea level to 100,000 feet (30,500 m). It also has an over-the-horizon capability through to line-of-sight airborne relay. Accuracy of the system is enhanced by the use of GPS satellites. The RAJPO GPS is capable of tracking 25 participants. MOCS operates at 141 MHz with 40 watts average power, and RAJPO GPS operates at 1,380 MHz with 27 watts average power. The Sea Range also employs an extensive array of high-speed photo-optical equipment from both ground based and airborne platforms to record test and training activity. NAWCWPNS metric radars typically operate at powers of about 1,000 kW and frequencies of about 5,700 MHz (NAWCWPNS Point Mugu 1997b).

### *Communication Systems*

Sea Range communication systems include voice communication systems (telephone), radio communication systems (including satellite interfaces), a Sea Range connectivity structure, video systems, and range timing systems. These communications systems provide the means for effective conduct of testing and training activities on the Sea Range. The communication services also provide for sea, land, and area clearance, range instrumentation connectivity, missile flight safety, target control, and target recovery operations. The majority of NAWCWPNS communication systems typically operate at frequencies higher than 30 MHz (NAWCWPNS Point Mugu 1997b).

Communication Nodes. The major communication nodes for the Sea Range are located at NAS Point Mugu, Laguna Peak, San Nicolas Island, and the Navy's leased area on Santa Cruz Island. The Sea Range Communication Center at NAS Point Mugu is linked to these communication nodes by wire, microwave links, or fiber-optic cable.

Communication Capabilities. The communication system provides immediate contact and access by command and control agencies for ships, aircraft, missiles, and targets on the Sea Range. There are also data links to Vandenberg Air Force Base (AFB), Edwards AFB, and NAWCWPNS China Lake. Activities by testing or training participants on the Sea Range can be monitored through the integrated displays located in the Operations Control Rooms at NAS Point Mugu and San Nicolas Island.

Radio Communications. Radio communications provide the link from ships and aircraft on the Sea Range to the command and control system both for operational training or testing activities. The Sea

Range provides radio communication systems in the High Frequency (HF), Very High Frequency (VHF), and Ultra High Frequency (UHF) bands. The Sea Range also has two UHF satellite communication systems: a multiple access system which can allow two or more channels to be transmitted over the same satellite link and a standard UHF FM system which has an encryption capability.

Microwave Systems. The Sea Range uses microwave transmission of voice and data signals over long over-water paths. These links include digital microwave paths from NAS Point Mugu to Vandenberg AFB via Santa Cruz Island. There are also two analog microwave paths between NAS Point Mugu and Vandenberg AFB. A microwave link between the Sea Range Communications Center and Laguna Peak serves as a backup to land lines connecting the two.

Fiber Optics Communications Underwater System (FOCUS). FOCUS connects Point Mugu with San Nicolas Island via a redundant system of fiber-optic cables. This system handles both voice and data transmission needs.

Command Transmitter System (CTS). The CTS provides the Sea Range with a system for the controlled testing of unmanned targets, aircraft, missiles, and other long range vehicles used on the range. CTS is a UHF transmitter designed for ground use for controlling pilotless aircraft or boats and other controllable unmanned systems. CTS allows the operator to control aircraft or target drones throughout the Sea Range or surface vessels within 40 miles (64 km) of the active transmitter site. The CTS is used to control airborne targets such as the Q-F4, Vandal, and AQM-37. The CTS also provides the capability for flight termination for systems which are considered too hazardous for test flights without an independent destruct capability. Flight termination control through CTS is used on systems such as the Tomahawk, Harpoon, and Vandal missiles.

#### *Chaff and Flare Use*



*C-130 Dispensing Flares*

Chaff and flare dispensing are conducted on the Point Mugu Sea Range during various weapons testing events. Chaff consists of thin polymer with a metallic (aluminum) coating which are dropped from aircraft or launched from ships to confuse or passively jam enemy radar, enabling friendly aircraft to avoid detection. The Range Control Officer (RCO) is responsible for ensuring that chaff operations are planned so that chaff drops typically do not impact within 10 NM (19 km) of the shoreline. Prior to scheduled chaff drops, the

Geophysics Division conducts special upper wind soundings and provides chaff impact prediction to the Operations Conductor and the RCO. Chaff drops are prohibited until impact prediction places chaff impacts outside the 10 NM (19 km) limit from shore.

Flares used on the Sea Range are of two types: defensive flares or flares used for illumination. Defensive flares are ejected from aircraft or launched from ships in order to confuse heat-seeking missiles. Illumination flares are dropped from aircraft or launched from ships by shells and descend to the surface by parachute, providing surface illumination during darkness. Illumination and defense flares burn out prior to ground or water impact. Baseline information on flare and chaff operations in the Sea Range (including the type of launch platform, areas involved, and altitudes) is summarized in [Table 3.0-5](#). Chaff and flares are used infrequently on the Point Mugu Sea Range (typically totaling less than 20 times per year). However, each chaff and flare operation often includes multiple launches (e.g., ten bundles of chaff may be released during one operation). In the baseline year, a total of 262 flares



**Table 3.0-5. Baseline Flare and Chaff Activity**

Operation	Platform	Number of Operations	Areas	Altitude
Defensive Flare Launch	F-14	3	3A, 3B, 4A, 4B, 5A, and 5B	Above 3,000 feet
Defensive Flare Launch	QF-4	3	Unknown	Above 3,000 feet
Paraflare Launch	Launched from ships	9	M-5, W-290, 4A, 4B, 5A, 5B, 3D, 3E, 3F, and W2	Above 3,000 feet
Chaff Launches	Helicopters and mobile ship targets	11	W1, W2, 3A, 3D, and 4A	Below 3,000 feet

Source: NAWCWPNS Point Mugu 1996f.

were launched during approximately 15 operations and 114 bundles of chaff were dispensed during 11 operations.

*Laser Systems (used for measurement purposes)*

A laser is an intense beam of visible electromagnetic radiation. Two types of laser systems are used occasionally on the Sea Range: designators and range finders. In addition, lasers are occasionally tested for their use in making meteorological measurements. Designators are mounted on missiles and use lasers to “acquire” (detect and track) targets. Range finders are mounted on aircraft and use lasers to measure the precise distance between the aircraft and a selected object. Use of these systems is primarily associated with missile testing activities but does not occur as part of routine operations on the Sea Range. Eye-hazard distances for humans have been established for various types of laser systems. This indicates the maximum distance at which injury could occur from direct exposure to the human eye. The eye-hazard distance for designators and range finders used on the Sea Range is approximately 12-NM (22-km) (NAWCWPNS Point Mugu 1997c). Consequently, any activity involving use of a designator or range finder requires implementation of standard range surveillance and clearance procedures.

3.0.2.3 Training Activities on the Point Mugu Sea Range

A - Fleet Training Exercises



*Fleet Training Exercise*

As noted previously in [Section 2.1.2.1](#), a FLEETEX is a generic term which broadly encompasses a variety of Fleet training activities. FLEETEXs are major Naval training events designed to exercise a Battle Group’s warfighting capabilities as they are intended to function in actual combat. A Battle Group refers to a group of ships that are tailored by size and type for specific warfare missions. FLEETEXs include development of an intelligence situation with the exercised units engaged against hostile forces simulated by other Naval units. These types of complex training exercises usually involve an entire Battle Group working together and are vital to maintaining operational readiness of U.S. Naval forces. FLEETEXs on the Sea Range typically last two to three days and generally involve multiple missile firings, 50 or more aircraft sorties, and varied types of surface combatants. A FLEETEX incorporates all or part of the scenarios previously discussed. The Point Mugu Sea Range provides the opportunity to involve weapons systems and personnel in realistic warfare

environments, including complex live-fire scenarios. FLEETEXs on the Sea Range do not involve the use of active sonar. Although each FLEETEX varies, all typically involve large numbers of ships and aircraft, usually with emphasis on air warfare and surface warfare training. Table 3.0-6 provides the number of aircraft sorties, targets, and missiles fired during a typical FLEETEX held on the Sea Range. Figure 3.0-18 displays a typical FLEETEX scenario.

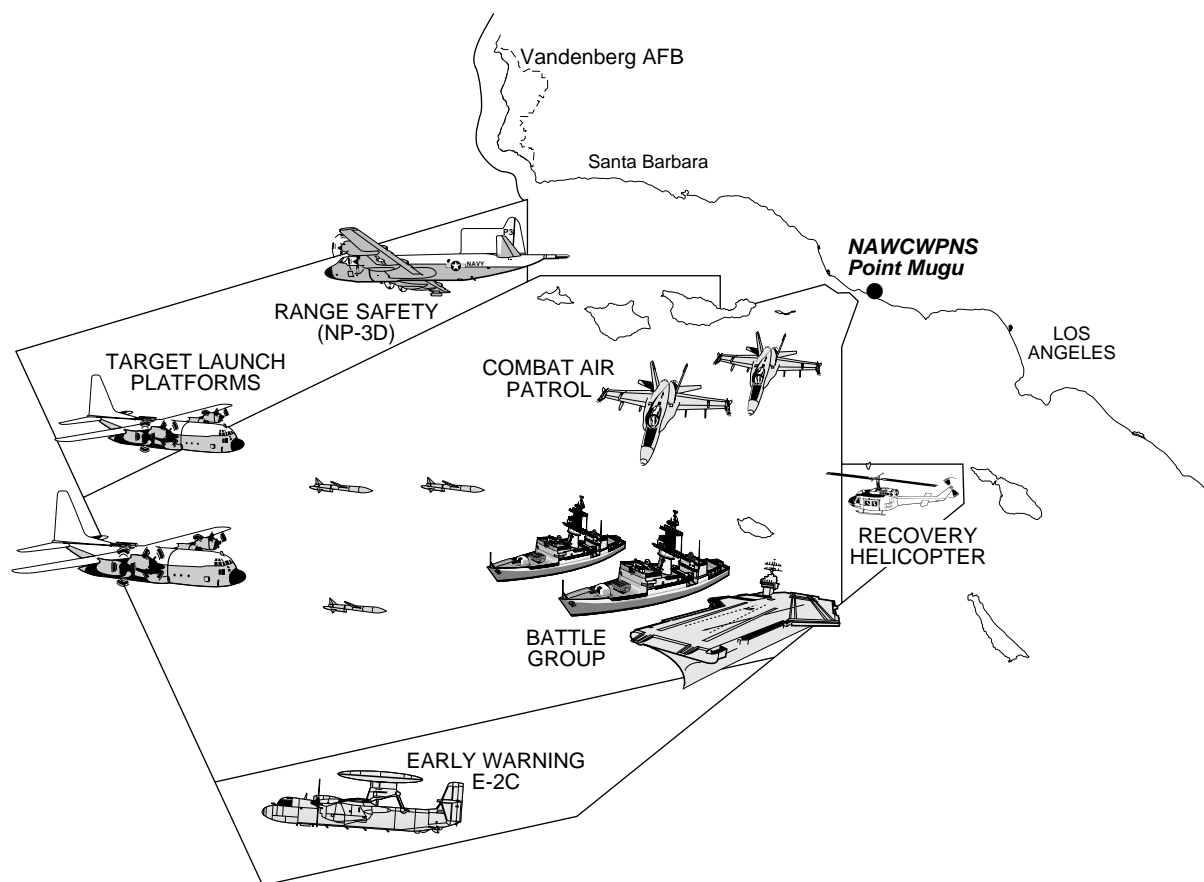
**Table 3.0-6. Typical Fleet Training Exercise Participants<sup>1</sup>**

	Aircraft Sorties	Targets Launched	Missiles Fired	Project Ships <sup>2</sup>
Total	57	33	34	18

<sup>1</sup>A FLEETEX typically occurs during a two to three day period.

<sup>2</sup>Includes 12 range support boats.

Source: U.S. Navy Third Fleet 1995.



**Figure 3.0-18  
 Representative Fleet Training Exercise Scenario**

During a FLEETEX most events occur according to a schedule known in advance to the participants, although there is some degree of flexibility allowed to increase the sense of reality. Naval forces which participate in a FLEETEX come from Naval bases outside of the Sea Range. Under most circumstances, support provided by the Sea Range is in the form of airborne or surface targets that are fired on by units participating in the FLEETEX. NAWCWPNS also provides range surveillance aircraft for range safety purposes. The usual objectives of any FLEETEX are to validate Naval Battle Group tactics, provide highly realistic training to the participants, exercise command and control procedures, and engage targets



representing hostile threats, all with due regard for the safety of ships and aircraft on the Sea Range. Most other operations on the Sea Range do not involve the use of ordnance with live warheads. However, FLEETEXs routinely expend missiles with live warheads against both airborne and surface targets. Weapons are not expended during these exercises unless the intended point of impact is within the assigned range area and a valid weapons release order is given.

### B - Littoral Warfare Training

Littoral warfare training is conducted by the Marine Corps and by Navy Special Warfare forces. Marine Corps amphibious warfare training involves operations on land and on sea. Amphibious operations include shore assault, boat raids, airfield seizure, humanitarian assistance, and light-armor reconnaissance. Amphibious landings are carried out principally by Amphibious Task Groups which consist of Naval surface forces and Marine Expeditionary Units (MEU). Navy Special Warfare forces conduct maritime operations under the command of Naval Special Warfare Command and can be deployed to participate in operations directed by the U.S. Special Operations Command (USSOCOM).

Navy special warfare capability is built around small units known as SEAL Teams (SEAL is an acronym for Sea, Air, Land). SEAL Teams can be deployed together with Amphibious Task Groups or separately to support the needs of Unified Commands worldwide. SEAL Teams are highly trained units with airborne, unconventional warfare, clandestine operations, underwater, and amphibious capabilities. They are supported by Special Boat Units with high performance surface and subsurface craft. [Table 3.0-7](#) shows environmental siting criteria associated with littoral warfare training at several San Nicolas Island beach locations at various times of the year. These siting criteria are used to determine when special warfare operations or small-scale amphibious training can be conducted at the island. Constraints are associated with seasonal marine mammal shore activity and bird nesting behavior.

**Table 3.0-7. Environmental Siting Criteria for Special Warfare and Small-Scale Amphibious Training at San Nicolas Island**

Beach <sup>1</sup>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Daytona Beach East	X	X	X									X
Coast Guard	*	*	X	X	X	X	X	X	X			*
Cissy Cove	*	*	X	X	X	X	X	X	X			*
Tender	*	*	X	X	X	X	X	X	X			*
Redeye	X	X	X	X	X	X	X	X	X			X

<sup>1</sup> See [Figure 3.0-2](#) for locations.

X - Beach Closed.

\* - Expect Closure in next few years.

Source: NAWS Point Mugu 1997a.

Marine Corps amphibious warfare training and SEAL special warfare training are described separately in the following sections.



### *Small-Scale Amphibious Warfare Training*



*Small-Scale Amphibious Warfare Training*

Amphibious landing training exercises in the Point Mugu Sea Range are currently conducted about four times per year and traditionally consist of small-scale manned raids at pre-approved sites. These activities typically have occurred at San Nicolas Island when the schedule of operations and existing environmental restrictions allow (see the previous subsection). Since the Fleet routinely uses other ranges for this type of training, the units become too familiar with the training grounds. To evaluate their training skills prior to

deployment, unfamiliar ground is required. Deployment of personnel is performed by small inflatable boats, helicopters, or aircraft. Helicopters have been limited to the insertion and extraction of troops to and from the San Nicolas Island airstrip or other approved areas. The following provides a general description of Marine Corps amphibious operations on and around San Nicolas Island.

Locations. Amphibious warfare training exercises have been conducted at various locations on and surrounding San Nicolas Island (see [Figure 3.0-2](#)). Beach areas are carefully selected to avoid or minimize damage to vegetation, wildlife, or cultural sites. There are several alternative sites that have accommodated shore landings, boat raids, and combat rubber boat landings. They include Daytona Beach (where resupply barges routinely land) and Redeye Beach (see [Figure 3.0-2](#)). Helicopter assaults, airfield seizure, and humanitarian assistance training can be conducted on the active airfield with proper coordination. Light armor operations including reconnaissance are restricted to the vicinity of the airfield and existing roads. Search and rescue missions can be accomplished on beach areas in the vicinity of the old jetty on Coast Guard Beach, Daytona Beach, the SLAM targets, and the Vandal launch pad. Hydrographic and nearshore reconnaissance can be conducted in the waters at Redeye Beach or off Daytona Beach.

Beach Landings. The MEU includes a Battalion Landing Team (BLT), but Marine landings on San Nicolas Island beaches have involved only company- and platoon-sized units. A company has three infantry platoons and a weapons platoon (a total of approximately 100-150 personnel). Each platoon has approximately 20-25 personnel. Company-sized operations on San Nicolas Island typically come ashore by aircraft or helicopter due to the sensitivity of the beach area on San Nicolas Island. A company-sized raid typically lasts about two days from start to finish.

Smaller platoon-sized raids arrive on the island by helicopter or by a small boat landing on selected beach areas. Trucks or tanks are not used. Operations performed by platoons include shore assault training, small boat landing (with rubber boats), land reconnaissance, and patrolling. For either sized operation, blank ammunition and smoke can be used, but live ordnance cannot. Flares are used only with permission of the Environmental Project Office due to the danger of fire.

Aircraft Support Operations. For San Nicolas Island operations, aircraft typically include two to four F/A-18s to provide air cover for a platoon, with four to eight aircraft for a company. These aircraft perform air cover and close air support missions flying or operating about 20 minutes below 3,000 feet (910 m) and 20 minutes above 3,000 feet (910 m) per mission. Two AV-8B aircraft and two AH-1 helicopters provide close air support. Two sections (two aircraft each) of AV-8Bs usually alternate operations, for a total of four sorties per exercise. The AS-1W Cobras similarly fly four sorties. No ordnance is dropped or fired during these operations. Marine units also come ashore San Nicolas Island



by helicopter at inland sites in suitable areas, including the airfield. In this case, CH-46 and CH-53 helicopters are used in approved locations. Helicopters also are used for extraction of Marine forces from the island.

### *Special Warfare Training*



*Special Warfare Training*

Special warfare training exercises are currently conducted about two times per year. Special warfare onshore operations generally involve human activities of individuals on foot (less than ten personnel), group movement on foot (less than 30 personnel), group climbing, clandestine patrolling, laying-in (for observation), and communication by radio. No land vehicles are used except for safety purposes. Helicopters perform hovering and landing operations and are also used to conduct personnel and cargo parachute drops. Surface craft activities on beaches include the use of Combat Rubber Raiding Craft (CRRC), Reinforced Inflatable Boats (RIBs), and Patrol Boat Light

(PBL). CRRCs are 15 feet (5 m) long with a 6-foot (2-m) beam, weighing 265 pounds (120 kg) and powered by a 55-horsepower (hp) outboard engine. RIBs range in size from 24 feet (8 m) long to 30 feet (10 m) long. PBLs are 25-foot (8-m) Boston Whalers.

Sites for onshore SEAL training on San Nicolas Island (see [Figure 3.0-2](#)) can include several beach areas (e.g., Redeye Beach and other areas northeast of the airfield). Selection of beach areas for training is based not only on training requirements but also the environmental sensitivity of the beach and inshore areas (see the previous subsection). Since SEAL training involves only a small number of individuals who are highly trained and leave little evidence of their presence or actual damage to their training environment, they have a greater choice of areas in which to train.

Locations for SEAL offshore operations include virtually the whole Sea Range, but especially the range areas around San Nicolas Island: M-3, M-5, 3A, and 4A. Special warfare training exercises extend in duration from eight hours to two days. Virtually all nearshore operations occur in Range Area M-3, the area encircling San Nicolas Island. Within this area, there are multiple alternative locations and routes that can be used.

#### 3.0.2.4 Range Use and Tempo

A general list of terminology associated with range use and tempo is presented in [Table 3.0-8](#).

#### A - Point Mugu Sea Range Activity Levels, FY95

The Scheduling Office keeps detailed records by fiscal quarter on Sea Range operations. Operations are categorized by sponsoring agency, type of program, phase of program, and test scenario. Each operation is given a descriptive and distinct code which provides information on the above data elements. The data in [Table 3.0-9](#) provide operations category information for FY95 scheduled, completed, scrubbed, and canceled operations. To estimate the number of operations that actually involved aircraft flights and ship operations, it is necessary to add completed operations and scrubbed operations (since supporting aircraft or ships may have launched prior to operation cancellation). The Scheduling Office also keeps records of use by hours scheduled versus hours used; the actual number of hours that the range was in use is also shown in [Table 3.0-9](#).

**Table 3.0-8. Definition of Range Use Operations Terminology**

Term	Definition
Operation	A test or training activity (e.g., test and evaluation of a Phoenix missile versus an AQM-37 target) that is scheduled on the Sea Range. An operation can involve as few as one aircraft or ship. An operation can also involve numerous aircraft or ships in a coordinated testing and training event and still be considered a single operation.
Canceled Operation	An operation in which the scheduled activity is terminated at least 2 hours prior to the launching of the test article.
Scrubbed Operation	An operation removed from the daily schedule within 2 hours of the scheduled launching of a target, missile, or other test article. Supporting aircraft or ships may have launched in advance of the launch of the test article. In this event, those assets would be recalled since the test or event could not be completed successfully.
Launch Operation	An operation involving a vehicle or device (target or missile) which departs from a launch site (e.g., BQM-34 launched from land on San Nicolas Island) or another vehicle (QF-4, F/A-18, F-14, or DC-130).
Support Operation	Any effort not specified as a Launch Operation is categorized as a Support Operation.
Completed Operation	An operation that is scheduled and executed on the Sea Range.
Sortie	The term generally refers to the complete flight of a single aircraft (i.e., one takeoff, one or more flight operations, and a final landing).

**Table 3.0-9. Point Mugu Sea Range Baseline Operations Summary, FY95**

	FY95
Completed Operations <sup>1</sup>	2,061
Scrubbed Operations <sup>1</sup>	416
Canceled Operations <sup>1</sup>	882
<b>Actual Operations<sup>2</sup></b>	<b>2,477</b>
<b>Hours Used</b>	<b>8,412</b>

<sup>1</sup> Scheduled Operations can be calculated by summing the Completed, Scrubbed, and Canceled Operations.

<sup>2</sup> Actual Operations were derived by adding Completed Operations and Scrubbed Operations.

Source: NAWCWPNS Point Mugu 1996g,h.

The number of aircraft sorties on the Point Mugu Sea Range in FY95 is shown in [Table 3.0-10](#).

**Table 3.0-10. Aircraft Sorties on the Point Mugu Sea Range and Missiles Launched by Activity Category, FY95**

	FY95
Aircraft Sorties	3,934
Missiles Launched	
-Navy Test Missiles	55
-Fleet Training Missiles	275
-Air Force Missiles	10
-Foreign Military Sales Missiles	11
<b>Total Missiles Launched</b>	<b>351</b>

Source: NAWCWPNS Point Mugu 1996g,h.



The distribution of missile launches on the Point Mugu Sea Range in FY95 is differentiated by missile activity type in [Table 3.0-10](#). About 78 percent of the missile launches were performed for training.

### B - Baseline Sea Range Activity

Current levels of activity on the Sea Range are described in order to assess the environmental effects of the proposed action. Baseline Sea Range activity is presented by aircraft sorties, missile launches, ship and boat activity, and target activity.

During the baseline year, a total of 2,477 completed and scrubbed operations occurred on the Sea Range. Since the Sea Range reporting system tracks operations rather than sorties, in order to assess the actual number of aircraft sorties, a manual review of the Sea Range database of operations was performed. These sorties, by aircraft type, were counted in the Range Resources Reports. These data on aircraft sorties by type are shown in [Table 3.0-11](#). The completed and scrubbed operations resulted in 3,934 aircraft sorties. The data in the table show only 1,951 operations versus 2,477: the difference is that not all operations on the Sea Range necessarily generate aircraft sorties.

Flying operations took place over the entire Sea Range but were concentrated in the six areas south and southwest of the Channel Islands (4A, 4B, 5A, 5B, 6A, and 6B). Areas of aircraft activity (extracted from the FY95 NAWCWPNS Schedule of Operations) and corresponding densities are depicted in [Figure 3.0-19](#). (Note: the aggregate numbers on the density chart exceed the total number of sorties [3,934] since an individual sortie may have activity in more than one range area.) Sortie density data are presented in Appendix B. Typical flight routes to and within the Sea Range were shown previously in [Figure 3.0-5](#).

### C - Baseline Missile Impacts

During exercise scenarios, aircraft, ships, and land-based systems launch a variety of missiles that terminate in the Sea Range. Missiles travel at high speeds and break up upon impact with the ocean. Missile debris is not recovered. Some missile targets (e.g., the BQM-74 and BQM-34) are recovered by parachute and then refurbished for another test. However, some test articles and some targets cannot be recovered. Safety hazard patterns for selected missiles are shown in Appendix B. [Table 3.0-12](#) provides the number of missiles by type that were launched on the Sea Range in the baseline year. Included in the numbers of missiles launched on the Sea Range are missiles from Vandenberg AFB. These missiles are included in the NAWCWPNS Point Mugu database since they affect scheduling of operations on the Sea Range when they are launched. These missiles are normally long-range ballistic missiles such as the Minuteman or Peacekeeper. Their flight paths pass above the Sea Range operational areas exclusively at high altitudes (about 100,000 feet [30,500 m]) and the missiles do not impact on the Sea Range.

[Figure 3.0-20](#) shows the density of missile impacts on the Sea Range based on NAWCWPNS Point Mugu missile launch data from the FY95 Schedule of Operations. Densities represent the cumulative number of missiles that impacted each area of the range. The data used to develop the Missile Impact Density Chart are included in Appendix B.

### D - Baseline Target Activity

[Table 3.0-13](#) provides the number of targets by type launched on the Sea Range in the baseline year. These were then separated into three categories: aerial, surface, and aircraft. Aircraft flights, such as a QF-4 (i.e., a QF-4 is remotely flown for use as a target), are considered aircraft sorties and are counted in

**Table 3.0-11 Point Mugu Sea Range Sorties by Aircraft<sup>1</sup>**

<b>Baseline Aircraft Activity</b>			
<b>Aircraft Type</b>	<b>Number of Operations</b>	<b>Number of Sorties</b>	<b>Percent by Sorties</b>
Multi-Aircraft <sup>2</sup>	249	996	25.3
F/A-18	308	869	22.1
F-16	140	432	11.0
F-14	222	411	10.4
Helicopters	205	244	6.2
QF-4/F-4	149	187	4.8
KC-135	122	123	3.1
A-6/EA-6	83	116	2.9
B-2	90	90	2.3
C-130	69	69	1.8
S-3	32	62	1.6
Lear	45	51	1.3
P-3	34	49	1.2
Cessna	36	37	0.9
A-7	13	23	0.6
Gulfstream	18	18	0.5
A-3	16	17	0.4
B-720	14	14	0.4
AV-8B	5	13	0.3
B-1	7	12	0.3
E-2 <sup>3</sup>	10	11	0.3
F-15	7	10	0.3
E-3	8	8	0.2
Tanker	8	8	0.2
EC-18B	7	7	0.2
F-111	6	7	0.2
AEROCOM	6	6	0.2
Partenavia	6	6	0.2
C-141	5	5	0.1
L-1011	5	5	0.1
Pioneer	4	4	0.1
T-37	3	3	0.1
T-39	2	3	0.1
ACRO	2	2	0.1
C-12	2	2	0.1
T-38	2	2	0.1
Other	11	12	0.3
<b>Total</b>	<b>1,951</b>	<b>3,934</b>	<b>100.0</b>

<sup>1</sup> The values in the table group similar aircraft together (e.g., F-14A and F-14D).

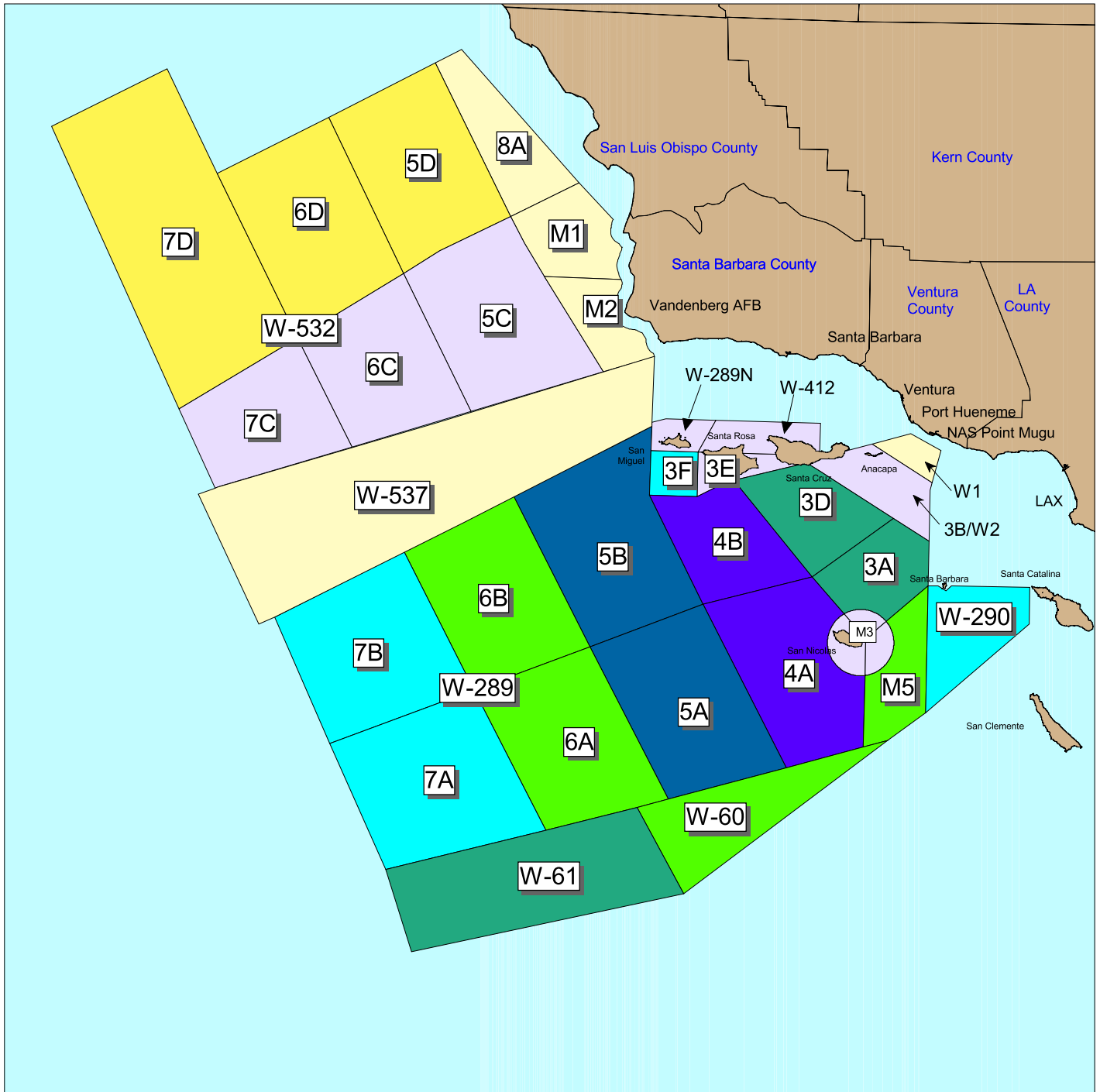
<sup>2</sup> NAWCWPNS does not track individual aircraft types for multiple aircraft formations. Numbers of these aircraft are documented in the "Multi-Aircraft" category. A value of 4 was estimated for the formation number of aircraft for the Multi-Aircraft category.

<sup>3</sup> The E-2 sorties originated from aircraft carriers during FLEETEX operations.

Source: NAWCWPNS Point Mugu 1996j.



# Baseline Sea Range Area Usage



- Aircraft Sorties per Area
- 0-499
  - 500-529
  - 530-1299
  - 1300-1459
  - 1460-1599
  - 1600-1999
  - 2000-2199
  - 2200-2450



50 0 50 Nautical Miles

Projection: Universal Transverse Mercator  
North American Datum 1927  
Zone 11

**Figure**  
**3.0-19**

**Table 3.0-12. Missiles by Type Launched on the Point Mugu Sea Range (Baseline Operations)**

Missile	Launched
AIM-7 Sparrow	82
SM-I/SM-II Standard	56
AIM-9 Sidewinder	46
AIM-54 Phoenix	30
FIM-92 Stinger	19
BATS	18
RGM/UGM-84 Harpoon	12
AIM-120 AMRAAM	10
SLAM	9
SSM	7
AGM-88 HARM	6
RIM-7 Sea Sparrow	6
I-Hawk	4
AGM-154 JSOW	4
AGM-65 Maverick	1
RGM/UGM-109 Tomahawk	1
NATACMS	1
Other	29
Air Force ICBM (From Vandenberg AFB)	10
<b>Total</b>	<b>351</b>

Source: NAWCWPNS Point Mugu 1996g.

range aircraft sortie totals. NAWCWPNS operations personnel refer to a QF-4 remote control sortie as a No Live Operator (NOLO) flight. Aerial targets are launched either from aircraft or surface launch sites. Surface targets include surface vessels (e.g., hulks, SEPTARs, QST-33, QST-35). A matrix of target descriptions and capabilities is presented in Appendix B.

#### E - Baseline Ship Activity on the Point Mugu Sea Range

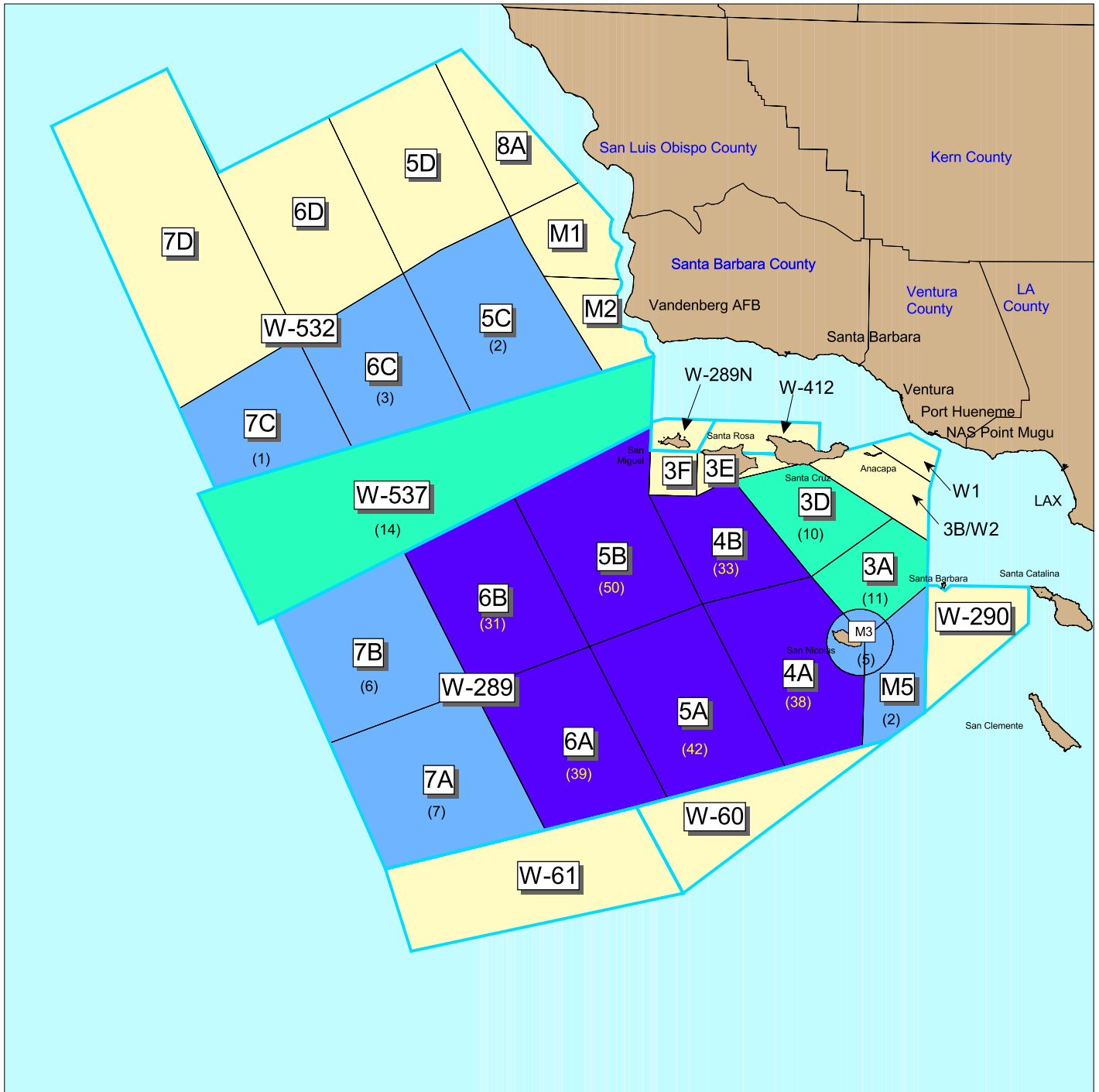
Ship activity includes Naval vessels used during T&E scenarios, range support for FLEETEXs, and vessels involved with surface-to-surface and surface-to-air scenarios. Submarines also come into the range (typically twice per year) to launch missiles in support of subsurface-to-surface tests. Ship activity can be further grouped by project or support craft. [Table 3.0-14](#) shows the baseline number of activities for project ships, project boats, and support boats used on the Point Mugu Sea Range. The multiple ships category data in this table were compiled from NAWCWPNS records where the type of vessel was not specified but was identified as operating with the MOCS. The MOCS terminology has replaced the term Extended Area Test System (EATS). [Table 3.0-14](#) also shows the baseline number and activity level of project boats and support boats used on the Sea Range. Typical routes used by Navy ships and boats on the Point Mugu Sea Range were shown previously in [Figure 3.0-7](#).

#### F - Baseline Composite Activity Level for the Point Mugu Sea Range

The numbers of sorties by aircraft, ships and boats, aerial targets, and surface targets for the baseline year are summarized in [Table 3.0-15](#).



# Baseline Sea Range Missile Impact Density



## Legend

Missile Impact Density

- No Impacts
- Low (1-9 impacts)
- Medium (10-30 impacts)
- High (31-50 impacts)



50 0 50 Nautical Miles

Projection: UTM, Zone 11,  
North American Datum 1927

Figure

3.0-20

**Table 3.0-13. Targets by Type Used on the Point Mugu Sea Range (Baseline Operations)**

Type of Air Target	Number Launched	Type of Surface Target	Number Launched
BQM-74	141	QST-35	34
AQM-37	29	Mobile Ship Target (MST)	21
QF-4 NOLO	24	QST-33	20
BQM-34	22	Tow Bar	8
MQM-8	9	Pontoon boat	5
QUH-1	7	Floating at Sea Target (FAST)	2
BQM-37	5	Improved Surface Tow Target (ISTT)	2
TDU-34	1	Hulk (Old Destroyer)	1
<b>Air Target Total</b>	<b>238</b>	<b>Surface Target Total</b>	<b>93</b>
<b>Total, Less Target Aircraft</b>	<b>207</b>		

Source: NAWCWPNS Point Mugu 1996k.

**Table 3.0-14. Baseline Number of Activities for Project Ships, Project Boats, and Support Boats Used on the Point Mugu Sea Range**

Project Ships		
Nomenclature	Ship Type	Number of Activities <sup>1</sup>
None	Multiple Ships with MOCS	220
SDTS	Self Defense Test Ship	49
FFG	Guided Missile Frigate	45
DDG	Guided Missile Destroyer	31
CG	Guided Missile Cruiser	23
DD	Destroyer	22
LPD	Landing Platform Dock	20
None	M/V Research	14
CV	Aircraft Carrier	14
SSN	Submarine	11
CVN	Aircraft Carrier	10
AO	Fleet Oiler	7
LHA	Landing Helicopter Assault Ship	7
LSD	Landing Ship Dock	6
AOE	Multi-Purpose Stores Ship	5
DD	Canadian Ship	4
None	Contract Ship	4
LHD	Landing Helicopter Dock	3
	<b>Project Ships Subtotal</b>	<b>495</b>
Project Boats		
SL	Project Boats	79
Support Boats		
AVR	Aviation Rescue Boats	225
	<b>Total</b>	<b>799</b>

<sup>1</sup> Ship activities are not double-counted.  
Source: NAWCWPNS Point Mugu 1996k.



**Table 3.0-15. Baseline Range Activity**

	<b>Range Aircraft Sorties</b>	<b>Ships and Boats</b>	<b>Aerial Targets (Less Aircraft)</b>	<b>Surface Targets</b>	<b>Missiles Fired</b>
Baseline	3,934	799	207	93	351

Source: NAWCWPNS Point Mugu 1996g.